

The AUTOMOBILE

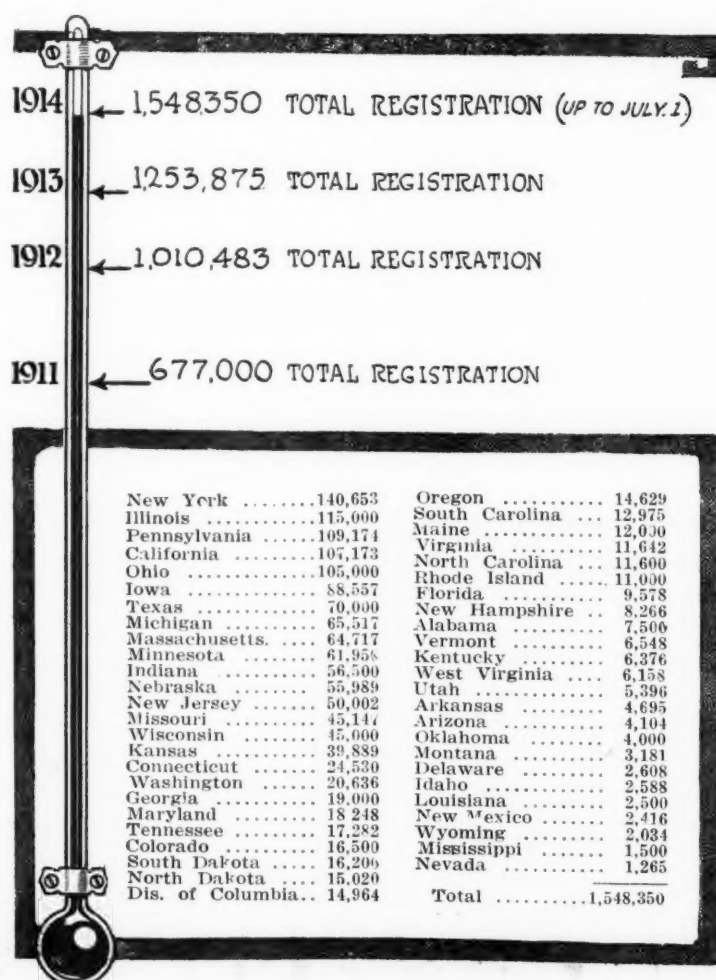
United States Has 1,548,350 Cars

Registration to July 1 Shows Gain of
294,485 in First 6 Months of 1914

By Donald McLeod Lay

FROM all indications, the year 1914 will be one of the greatest in the history of the automobile industry. Surprising as were the gains in other years, 1914 bids fair to surpass them all, for the registration officials of the various states report increases in nearly every instance, the total registration for the United States amounting to 1,548,350 automobiles and motor trucks up to July 1. These figures, of course, include both the gasoline and electric vehicles as well as a number of steam machines. In arriving at this total all cases of duplicate registration, due to the registration of non-residents in the various states and re-registration upon transfer of ownership, are subtracted.

On January 1, 1914, allowing for all duplicate registration, there were 1,253,875 cars and trucks in use in the United States. By July 1, there had been an increase of 294,485 over this figure, a



Registration to July 1, 1914, allowing for duplicate registration

gain which is particularly surprising and significant when all the talk of hard times, lack of prosperity, etc., is considered.

From the number of new registrations during the first half of 1914 it is apparent that the people of the United States have been buying cars in even greater quantities than ever before. The increase in the number of automobile owners is especially noticeable in the smaller communities and on the farms. In fact, the tremendous amount of money invested in automobiles and accessories in several of the states has drawn the attention of prominent business men and produced a strong impression upon the banking fraternity.

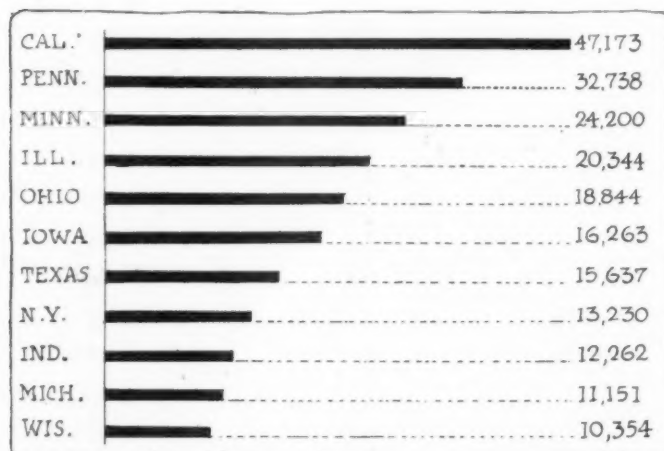
The present standing of the states in respect to the number of automobiles and motor trucks may be seen by referring to the tabulation on this page. New York still leads the van with 140,653, after all duplicate registrations have been allowed for, a



Map showing actual registration of automobiles and trucks up to July 1, 1914, excluding duplicate registrations

gain of 13,230. Illinois proudly claims second place with 115,000, an increase of 20,344. A startling change, however, has taken place after this. Pennsylvania has sprung into third place with 109,174, taking first place according to the proportion of gain among all the states with 32,738. The figures given for California up to January 1, 1914, were incomplete, owing to the fact that a new law went into effect last fall and the registration of the cars in that state had not been completed by that time, the registrations being given as only 60,000. Under the new law, however, California stands fourth in rank, the registrations amounting to 107,173, allowing for duplicate registrations. The apparent increase of 47,173 is misleading in that both the new registrations and those which had not been completed under the new law up to January 1 are included.

Ohio, which stood third at the beginning of this year is now in fifth place with 105,000 cars and trucks, an increase of 18,844 in 6 months.



Eleven states showed increases of over 10,000 cars. The California figures, however, are misleading, owing to the new law

Iowa, which was fifth on January 1, is now in sixth place with 88,557, an increase of 16,263. The farmers in this state have been buying cars in great quantities, so much so that the president of a railroad which has lines in this state made a public statement a few weeks ago to the effect that Iowa people are spending more money for automobiles and accessories than for railroad fares inside the state. He went on to say that the public is more interested in the price of rubber than in the price of steel rails and more interested in good highways than in good railroads. Such a statement as this coming from such a source may be taken as strikingly indicative of the progress which Iowa is making as an automobile state.

Texas Shows Big Gain

Texas is one of those states which unfortunately has no state automobile registration and consequently it is not easy to obtain statistics regarding the number of cars and trucks in use in the Lone Star commonwealth. The Dallas Chamber of Commerce, however, made a census of the state for this purpose last fall and at that time reported that there were 54,363 cars in use in Texas. In response to a letter from THE AUTOMOBILE, the Chamber reported that while no census has yet been made for the first half of 1914, it is positive that 70,000 is a very conservative figure for the number of cars and trucks in use in Texas up to July 1. This puts the state in seventh place and credits it with a gain of 15,637 cars and trucks. On January 1, Texas was credited with 54,363 cars, which gave it ninth place.

Michigan, which stood eighth on January 1, retains its old position with 65,517 cars, an increase of 11,151.

Massachusetts, which was sixth at the beginning of the year, is now ninth, but with 64,717 cars, compared with 61,746, a gain of 2,971.

Minnesota has shown an unexpected increase, jumping from fourteenth place at the beginning of the year to tenth place July 1 with 61,950 machines registered, a gain of 24,200, putting the state second in the order of gains for the

first 6 months, the abnormal figures for California not considered.

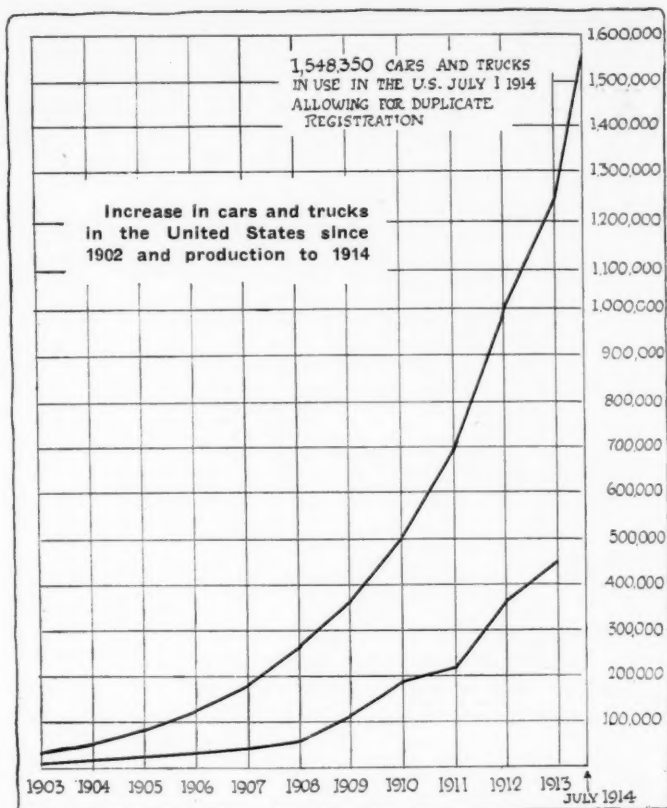
Three other states have registrations of over 50,000, Nebraska having 55,989, an increase of 8,715 over the figures for the first of the year, Indiana which is credited with 56,500, or 12,262 more than on January 1, and New Jersey, which is still barely over the mark, having 50,002, an increase of 489 for 6 months.

Three other states have over 35,000 cars, Missouri having 45,147, Wisconsin 45,000 and Kansas 39,889. The rest of the states taper down from Connecticut with 24,530 and Washington with 20,636 to Mississippi with 1,500 and Nevada with 1,265. Nevada has always had the last position in the order of registrations, but is now beginning to show some promise of mounting a little higher in the table, having gained 134 cars in the first 6 months of 1914.

Little Improvement in Laws

The automobile law situation is but little improved this year. Two of the states, California and Kentucky, are under new laws and several of the other states are making or are contemplating making changes in their motor vehicle legislation. Among these is Massachusetts, which has recently enacted some amendments to its statutes. The Michigan law is in the uncomfortable predicament of being declared invalid by the State Supreme Court, so a new act will have to be drawn for that state. The District of Columbia, Florida and Texas are still licensing cars perennially, that is, each car is licensed but once and not every year as is the case in most of the states. Minnesota has triennial registration, that is,

(Continued on page 330.)



Automobile Registration in Each State in the Union up to July 1, 1914, with Duplicate Registrations

State or Territory	Total Registration	New Registration	Registration up to July, 1914	Gasoline Passenger Cars in Use	Gasoline Commercial Cars in Use	Electric Passenger Cars in Use	Electric Commercial Cars in Use	Non-Resident Registration*	Re-Registered**	Chauffeurs Registered	Total Fees	Remarks
Alabama	7,500	2,000	5,500	***	***	***	***	None	***	1,000	\$92,000	
Arizona	4,293	710	3,583	4,027	208	16	None	None	189	1,000	30,638	
Arkansas	4,695	1,695	3,000	***	***	***	***	None	***	270	4,965	
California	107,173	47,173	60,000	***	***	***	***	None	***	15,347	60,833	New law
Colorado	16,500	3,500	13,000	***	***	***	***	None	***	2,200	364,948	
Connecticut	24,530	1,267	23,263	21,555	2,375	400	200	***	***	31,050	30,152	
Delaware	2,608	225	2,373	***	***	***	***	***	***	2,467	10,086	Perennial reg.
Dist. of Col.†††	17,464	839	16,625	16,276	603	710	90	2,500	***	21,795	***	Perennial reg.
Florida	10,078	706	9,372	***	***	***	***	***	***	***	***	New law
Georgia	19,000	***	22,000	18,335	335	315	15	***	500	***	***	
Idaho	2,588	415	2,173	***	***	***	***	***	***	***	***	
Illinois	115,000	20,344	94,656	***	***	***	***	***	***	17,489	595,362	
Indiana	57,000	12,262	44,738	53,000	2,000	1,000	500	None	500	2,398	385,000	
Iowa	88,557	16,263	70,294	***	***	***	***	***	***	12,000	199,445	
Kansas	39,889	5,523	34,366	***	***	***	***	***	***	None	41,000	
Kentucky††	6,376	***	7,210	***	***	***	***	***	***	***	***	New law
Louisiana†	2,500	Lower est.	3,200	***	***	***	***	***	***	***	***	
Maine	12,700	2,130	10,570	12,195	498	5	2	500	200	None	166,000	
Maryland	18,248	3,994	14,254	16,558	1,440	150	100	***	***	***	***	
Massachusetts	64,717	2,971	61,746	56,900	6,209	***	695	***	***	13,935	780,364	
Michigan	65,517	11,151	54,366	***	***	***	***	***	***	***	196,551	Law invalid
Minnesota	62,000	24,200	37,800	***	***	***	***	***	50	***	***	
Mississippi†	1,500	Lower est.	3,000	***	***	***	***	***	***	5,257	***	Triennial reg.
Missouri	46,143	8,003	38,140	***	***	***	***	***	996	***	201,857	
Montana	3,181	***	5,686	***	***	***	***	***	***	***	8,000	
Nebraska	55,989	8,715	47,274	***	***	***	***	***	***	***	***	
Nevada	1,265	134	1,131	1,201	64	***	***	***	***	None	3,840	
New Hampshire	8,766	1,330	7,436	8,651	50	45	20	500	***	2,662	146,049	
New Jersey	51,849	489	51,360	49,567	2,282	***	***	***	1,847	55,532	668,394	
New Mexico	2,436	715	1,721	***	***	***	***	***	20	***	16,764	
New York	145,894	13,230	132,664	123,722	12,180	7,000	2,992	1,630	3,611	56,042	1,351,826	
North Carolina	11,600	1,600	10,000	***	***	***	***	***	***	***	75,000	
North Dakota	15,095	2,025	13,075	15,065	15	15	None	None	75	***	48,456	
Ohio	105,000	18,844	86,156	***	***	***	***	***	***	5,000	591,596	
Oklahoma†	4,000	Lower est.	4,900	***	***	***	***	***	***	***	***	
Oregon	14,629	672	13,957	***	***	***	***	***	***	1,351	69,111	
Pennsylvania	112,916	32,738	80,178	100,000	3,000	7,455	2,461	1,000	2,742	23,370	1,067,295	
Rhode Island	11,000	818	10,182	***	***	***	***	***	***	***	***	
South Carolina	12,975	1,475	11,500	***	***	***	***	***	***	***	***	Local reg.
South Dakota	16,200	1,622	14,578	***	***	***	***	***	***	***	***	
Tennessee	17,282	3,179	14,103	***	***	***	***	***	***	***	34,564	
Texas†	70,000	15,637	54,363	***	***	***	***	***	***	***	***	Local and perennial reg.
Utah	5,396	928	4,021	4,939	117	117	6	***	***	***	2,728	20 steam cars
Vermont	6,781	863	5,918	6,592	180	4	5	***	233	1,443	127,619	
Virginia	11,642	2,620	9,022	***	***	***	***	***	***	***	101,878	
Washington	20,636	***	24,178	***	***	***	***	None	None	None	41,272	
West Virginia	6,158	1,070	5,088	***	***	***	***	***	***	250	60,174	
Wisconsin	45,000	10,354	34,646	***	***	***	***	***	***	***	236,640	
Wyoming	2,034	450	1,584	***	***	***	***	***	***	***	***	
Total	1,554,300	285,879	1,279,950†	508,673	31,556	18,055	7,086	6,130	10,963	271,858†	\$7,812,907	

NOTE.—3,000 steam passenger cars and 250 steam trucks are included among the gasoline machines. Dots indicate that previous figures are doubtful, discrepancies indicating that the registration officials have made an error in reporting. *The number of cars registered belonging to residents of another state. **Number of cars registered owing to changes of ownership, etc. ***Not listed separately by registration officials. †Estimated on basis of population with reference to location and sectional registration. ††New law makes registration figures low. †††Figures are high as many re-registrations are included. ‡Estimate furnished by Dallas Chamber of Commerce, which states that figures given are very conservative.

War Closes French Car Factories

Activity Is Confined to Aeroplane Plants—American Manufacturers Have Orders Cancelled—Tire Prices Go Up—Big Demand for Cars Here, However

War Booms English Trade

By J. Sidney Critchley, President of the Institution of Automobile Engineers

By Western Union Cable

LONDON, ENGLAND, Aug. 11—The position of the industry here is being severely tried. All private sales are for the present dead, and all programs for 1915 are at present in abeyance. Many passenger cars are being bought for war purposes which will keep some factories busily employed for the time being.

Export trade, in view of the seas being open, it is anticipated will be maintained or even increased when permission to export cars can be obtained.

Due to most of continental factories being closed or working exclusively for governments, continental agents here are absolutely cut off from supplies. Supplies of materials from Belgium, France and Germany are no longer available. All manufac-

turers will be compelled to rely on home materials. For example, the stock of Bosch magnetos is very limited and all available supplies will be required for commercial vehicles.

The great demand for commercial vehicles for transport will keep this branch of the industry very busy as large numbers both new and second-hand have been taken over, including some hundreds of London omnibuses.

The withdrawal of horses also increases the demand for commercial vehicles.

This branch will have a booming time, but output may be retarded by lack of materials and restricted output of passenger vehicles must prevail.—Sidney Critchley.

NEW YORK CITY, Aug. 12—*Direct news from Paris, France, of the effect on the French automobile industry of the prospects of war—Our Paris correspondent gives some information of what the actual declaration of war ere this has caused. On August 1 all purchasing by the factories stopped, and where cars were ordered, but had not been delivered, customers were refusing to take them.*

Workmen were being discharged from all factories, and in many cases production was so low that the department heads were taking inventory.

In further commenting on the situation, W. F. Bradley, resident correspondent of THE AUTOMOBILE in Paris, writes under date of August 1:

"Should war break out the result will be to close three-quarters of the automobile factories in France. Not only would the demand cease with the breaking out of hostilities, but in very many cases so many men would be called up for military duty that it would be impossible to run the works. In one particular factory every foreman and head of a department was required to do duty as a soldier within a week of the call to mobilize, and some of these men had to be at their post within twenty-four hours of the call.

"Activity is confined to the aeroplane and aeroplane motor factories. The section of the Renault factory producing aeroplane motors is under army control; the same applies to the whole of the Gnome motor works, as well as to the Le Rhone factory. Aeroplane builders, as well as aeroplane motor manufacturers are forbidden to supply private customers.

"Everything necessary has been done to put practically the whole of the Paris motorbuses at the service of the

army at a moment's notice should the call come. These vehicles would be rapidly transformed to act as meat wagons. Automobile truck owners, having subsidized vehicles, have received intimation to hold them in readiness for delivery to the military authorities at any time.

"A close inspection has been made in the various factories of the different types of cars which could be seized for army requirements if war breaks out. These cars would be used for carrying staff officers and would be driven by factory mechanics acting as military reservists. A considerable increase has been made to the reserves of gasoline, lubricating oil and automobile tires held by the army authorities."

Accessory Business Injured

American manufacturers have already felt the effects of the European war. Two or three large accessory manufacturers have received cable orders to cancel all shipments to Europe, and their branch houses in such cities as London, Paris and Berlin have been closed.

With automobile manufacturers the situation is somewhat worse, because buying has practically ceased in all the belligerent countries. It is a case of demand as well as supply returning to zero in less than a week. Several American makers today find themselves with cars for European shipment on hand. Several of these makers build chassis with right-hand steering for Europe and left-hand steering for the domestic market. It will be difficult to dispose of these vehicles unless attention is turned to the South American market where the rules of the roads in some places call for the steering wheel on the right side.

Many representatives of the American industry are at present in Europe where they have gone on different mis-

sions, some to inspect the foreign plants, and others on pleasure trips. Little, if any, concern need be given for them as the situation has greatly clarified so far as tourists are concerned since the opening of the war.

Tire Prices Up

In America the tire situation has been affected more directly than any other, as a result of the war, due to the fact that practically all crude rubber, coming from either Ceylon and the Straits Settlements, is brought in English bottoms, and until the British navy is prepared to protect its mercantile marine there will undoubtedly be a shortage of rubber and the price which has already jumped from 55 cents to \$1.12 may go much higher. Nearly 70 per cent. of American rubber comes from the East, and it would be difficult to get supplies so long as commerce on the high seas is hampered. Fortunately the touring season is near an end, July and August being the heaviest months, but in spite of this the situation is not desirable, as the tire makers are short on stock, being practically at the close of the 1914 season, and there is little crude on hand in New York City, and very little in London and little in transport. Many of the rubber companies report a stock on hand adequate for 30 to 60 days. They are already shutting off on manufacture.

Our Southwestern Market

With the foreign market in Europe closed by the war American manufacturers are looking about for other fields. Owing to the good crops in the southwestern district, there is certain to be greater prosperity and more car buying than formerly. In the southwest territory adjacent to Kansas City, the farmers have just completed harvesting the crop of winter wheat which is 50 per cent. larger than any other previous year, and as the prosperity of that section depends almost entirely upon that one crop, the value of this to the automobile industry is apparent.

In 1913 the value of the wheat in Kansas alone—all of which is in the Kansas City territory—totalled about \$50,000,000. This year conservative estimates of the final value of the 180,000,000 bushels produced in that state place it at \$120,000,000. In 1912 the value was \$70,000,000 and in no single year has it ever gone above the \$100,000,000 mark.

Eighty dealers in Kansas City will handle the motor cars that will be sold in Kansas, northern Oklahoma, southern

Nebraska and western Missouri. Fifty-five others will handle the tires and accessories.

At this time stocks are down to a minimum and large shipments are being received daily from the factory. The figures of the Kansas City Motor Car Dealers' Association show that 100 cars a day are being shipped into that city.

The local Buick agency expects to sell 1,000 cars before January 1. Its 1914 business already shows an increase of 25 per cent. over the corresponding months of 1913 and it is now 125 carloads behind its orders.

The Moriarty Motor Co., Lozier, Abbott, Regal and Detroit, will sell 300 cars before January 1. Its 1914 business is ahead of its 1913 sales.

The local Overland factory branch sold 2,048 cars in the fiscal year ending August 1, an increase of 512 cars over its sales of the previous year. It has asked for 3,500 cars for its business during the next 12 months.

The Bond Motor Co., handling the Maxwell until August 1 and now the Oldsmobile, reports a 50 per cent. increase for its business so far this year.

The Velie company has prepared for a 25 per cent. increase during the next six months.

The fiscal year of the Ford company closes on October 1. During the ten months from October 1, 1913, to August 1, 1914, its sales increased exactly 45 per cent. over the sales of the previous 12 months. The company expects to reach a final increase for the fiscal year of 1914 of 65 per cent. Plans are being made to double the capacity of the Kansas City assembling plant.

The 1914 business of the Studebaker shows an increase of 250 cars sold during 1914, or a total of 1,450. An increase of 25 per cent. is expected during the next season.

The Hudson-Brace Motor Co. (Hudson) sold 200 more cars this year than last and estimate they will handle forty to forty-five cars a month until the first of January.

The Hupmobile agency sold 600 cars during the twelve months ending August 1 and are making preparations to increase that number to 800 during the next year.

This increase of sales has brought about the construction of enlarged buildings for the Kansas City branches. The Overland, Case and Jackson companies already have moved into especially designed and constructed buildings. The Hupmobile and the branches of the Republic and Federal tire companies have commenced the construction of new and enlarged quarters. Other firms are remodeling their buildings.

Carl G. Fisher and Party Escape War

President of Speedway and Prest-O-Lite Co. Reaches Home—Racing Drivers in French Army—Factories Active

INDIANAPOLIS, IND., Aug. 11—*Special Telegram*—Carl G. Fisher, president of the Indianapolis Motor Speedway and of the Prest-O-Lite Co., reached home this morning accompanied by Mrs. Fisher and John Aitken of the National company, having escaped from the European war. The party came back on the White Star liner *Laurantia*, an English ship, which landed at Montreal Saturday.

"We were just 6 hours ahead of the war net," says Mr. Fisher. "We had some trouble getting away, but it pales into insignificance when compared with the difficulties others are having. There must be at least 100,000 Americans trying to get home."

"We were at Le Mans when the war cloud broke, prepared to watch the running of the little Grand Prix. We lost no time in hurrying to England, whence we sailed on the *Laurantia*."

"It looks as if the war would last for some time. In England they are not confiscating motor cars, but I understand

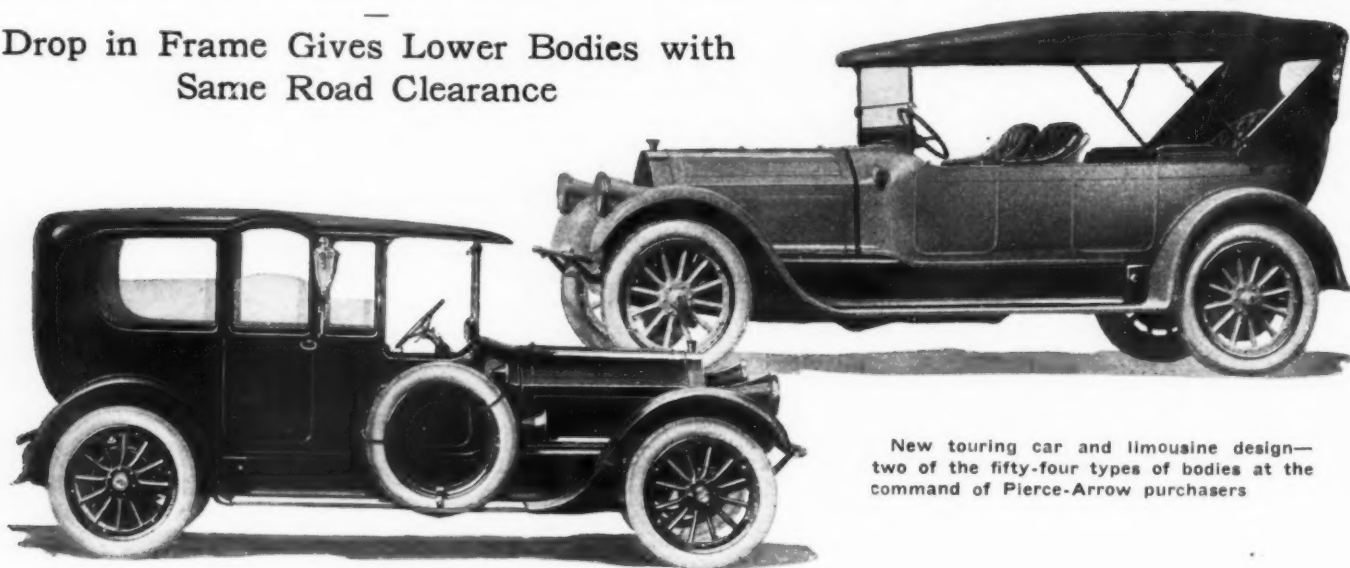
they are in Germany and several other countries. The war is demonstrating to everyone just how valuable the automobile is; in fact, it is invaluable. The various governments find it particularly adaptable to the troops. They can load fifty soldiers in one motor truck and move them faster than they can by freight train.

"The foreign motor car factories will not be shut down for the reason that their products are needed for war purposes. But the factories are greatly handicapped by so many of the workmen being reservists. Boillot is aide de camp and driver for the generalissimo of the French army, Goux is a mine layer in the army, while Thomas, winner of the last 500-mile race is an aviator in the French army."

"As to what effect this will have on the next 500-mile race it is hard to say. However, I look for the war to be over by that time. There will be enough of the foreign cars to insure European representation while I look for more American cars then ever."

Pierce Offers 54 Body Types

Drop in Frame Gives Lower Bodies with Same Road Clearance



New touring car and limousine design—two of the fifty-four types of bodies at the command of Pierce-Arrow purchasers

ONE primary change has been made in the Pierce-Arrow series three cars as compared to the preceding model known as the series two. This has been a drop in the central portion of the frame. With this single change the entire appearance of the new line has been altered and in connection with its adoption one or two other minor changes have been necessitated. The principal alteration that has come up on account of the dropped frame has been the abandonment of the gravity gasoline feed and the substitution of a pressure feed system with the gasoline tank at the rear of the chassis. The introduction of the pressure feed has in turn caused a change in the raising of the carbureter and hence an increase in its accessibility. Prices are:

	38-C 3	48-B 3	66-A 3
Touring	\$4,300	\$5,000	\$6,000
Five-passenger	4,300	4,900	5,900
Roadster	4,300	4,900	5,900
Limousine	5,200	6,000	7,000
Vestibule brougham.....	5,350	6,200	7,200

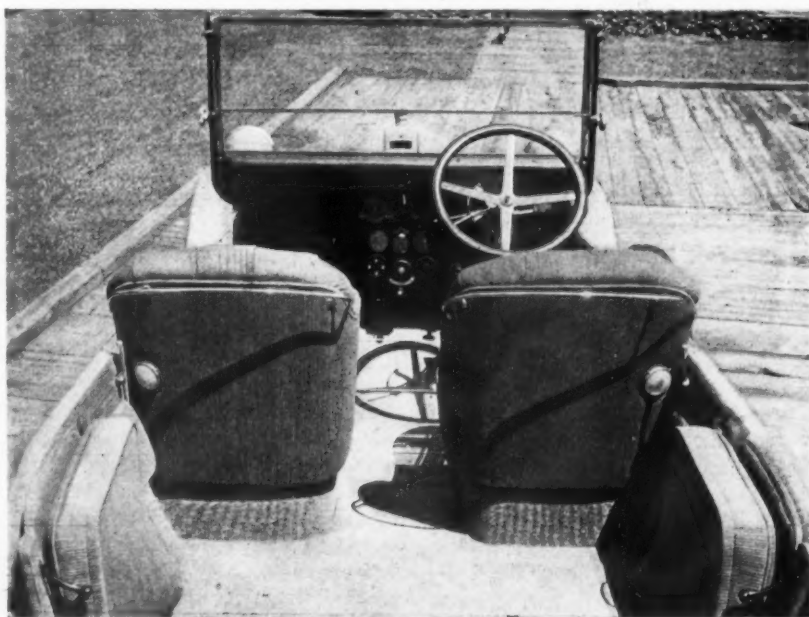
With but one exception, no change has been made in the prices. The one exception concerns the largest limousine which now lists at \$7,000 instead of \$7,100. The prices of the other models remain as before.

On all three of the sixes which compose the Pierce line it has been found possible on account of the increase in drop of the frame to lower the bodies and running boards without reducing the road clearance. There are also a number of other minor chassis changes which are designed to increase the convenience and comforts of the driver.

The control members, including the accelerator, hand throttle and spark control, have been simplified; the electric starter is operated by a single push button on the dash in place of a pedal and, in place of the plugs heretofore used, a Yale lock is provided for the bank of switches. The engine cannot be started if the bonnet is locked and the key removed from the ignition switch. The engine primer has been simplified and the housing of the universal joint between the clutch and the gearbox has now been extended to cover the entire mechanism.

It is in the body work that the Pierce company offers an exceptionally wide choice to the purchaser. There are fifty-four body types and a practically unlimited number of color schemes to choose from. The Pierce company states that in offering such a wide range of choice it is excelling in variety even the foreign builder who sells his chassis separately. All of these bodies are entirely new in design. The standard

brougham, landaulet, suburban and landau bodies have rounded corners, domed roof and in general lines which have been kept simple but at the same time follow the stream design of up-to-date practice. In addition to these standard types there are many modifications and combinations of different design. The brougham-landaulet and the suburban-landau are arranged with unusually wide side windows, and are built with only flat roofs. All standard dome roof designs have arch doors. All standard and optional flat



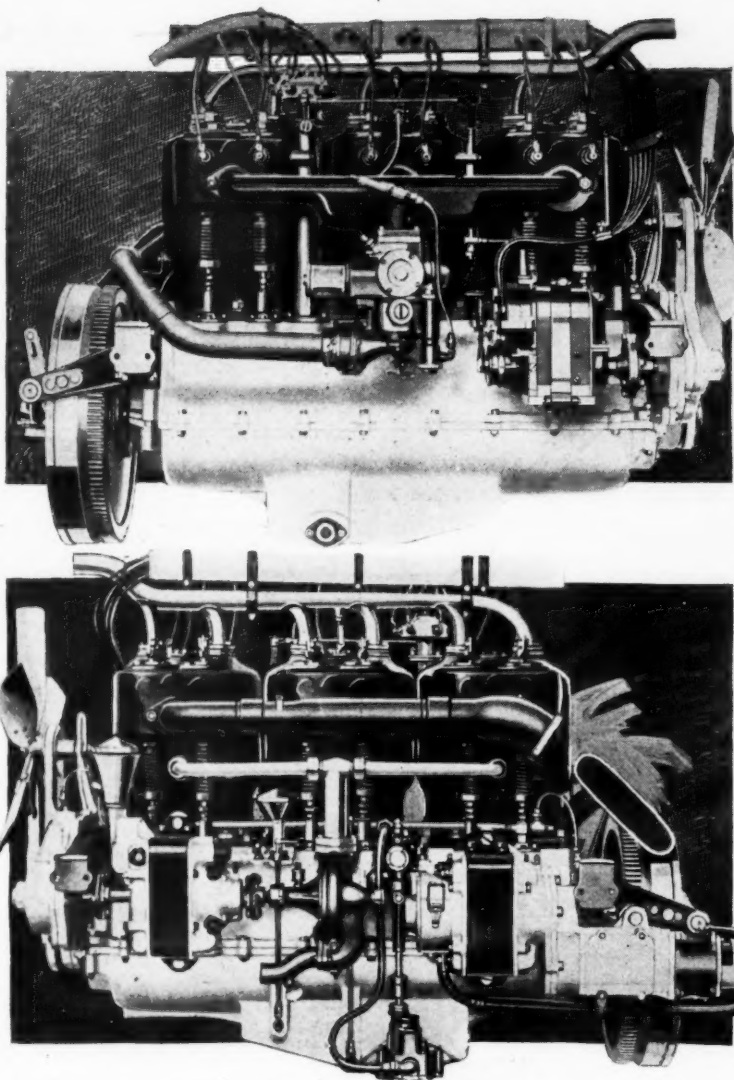
Divided front seat used in Pierce-Arrow series three touring car

roof designs are built without the arch doors.

In addition to the different body designs and to the general improvement in appearance by reason of the lower cars, many noticeable features stand out in the new models. In fact the Pierce-Arrow Co. states that this new model has more power, a better get-away, more speed, greater comfort and more style than any other model turned out by the company. The increase in power and pick-up is ascribed to the force-feed gasoline system and the style and appearance to the lowering of the bodies.

The fenders are of new and wider design and are calculated to give better protection against mud and water than formerly. A Pierce top which has been named a Solitaire because it can be operated by one person is standard equipment on all the touring cars. The standard touring cars are fitted with individual front seats arranged with a space between to give easy passage from the front to the rear compartment. An undivided front seat will be provided if specified at no extra cost. All Pierce cars continue to be built with right drive and right control as in all the former models.

Two electric lights are provided in the backs of the touring car front seats to light the tonneau steps. The tail light and license illuminator are now combined in a unit and a rear bumper protects the gasoline tank against collision. The headlights are carried on the front fenders as in series two, but they have been moulded into the fenders with a more graceful curve and are now one of the most perceptible



Left and right side of the six-cylinder Pierce-Arrow motor. All three sizes are similar in design

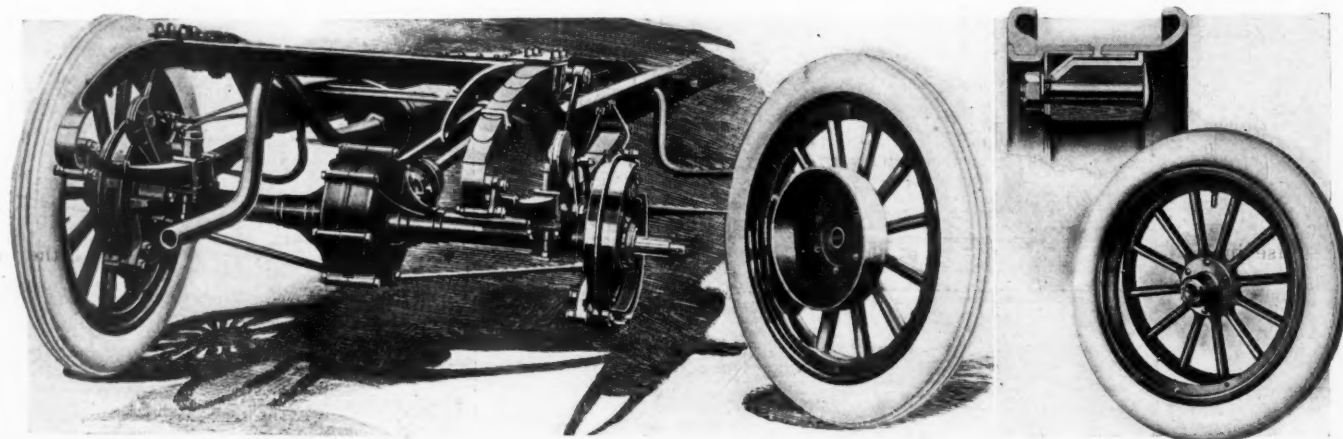
points of difference between the series two and series three models.

All three Pierce-Arrows are built along similar lines. The 66-horsepower is known as the 66 A-3; the 48 as the 48 B-3 and the 38 as the 38 C-3. The power plants of all these chassis are, of course, different in size, the largest being 5 by 7 inches; the 48, 4.5 by 5.5, and the 38, 4 by 5.5 inches. With the exception of the differences in size, lines of design of these three models are entirely similar and a description of the Pierce-Arrow product can be hence given as a unit.

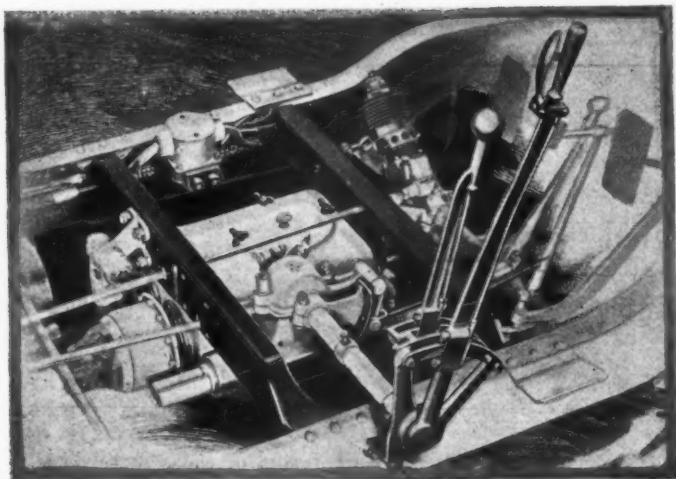
All three engines are six-cylinder types with the cylinders cast in pairs and have interchangeable inlet and exhaust valves located on opposite sides of the cylinders. The object in keeping the T-head design, according to the Pierce engineers, is to keep the valve area large and at the same time to maintain as short an overall length as possible. The crankshafts are provided with seven bearings and each bearing is lined with a white bearing metal that is imported from England. The bearing bushings are carried

within a bronze shell and the white metal is cast directly into this shell.

The pistons have their wristpins at about the center and carry three rings above this point. At the bottom of this piston there is a wiper ring for distributing the oil. The connecting-rods are I-beam in section and are held at their lower point by bearings lined with the same material as is used in the main bearings. One point in Pierce-Arrow prac-



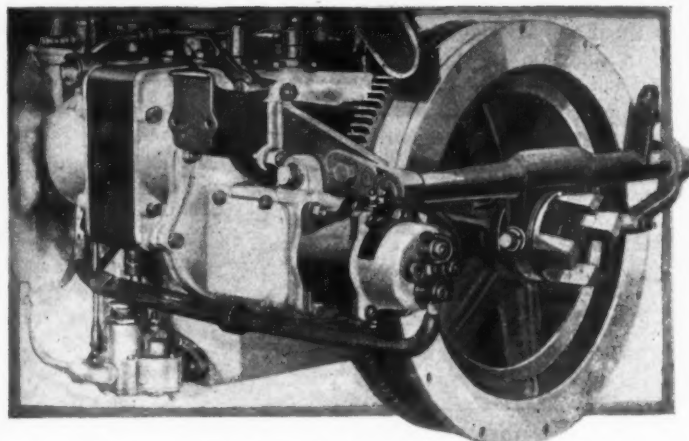
Left—Rear construction of the Pierce, showing running gear, springing and torque members. Right—Construction of the Johnson patent demountable rim



Pierce four-speed gearbox mounted amidships

tice which is considerably different from that generally employed is the use of a built-up camshaft. The cams are pinned to the shaft and the Pierce company states that out of 165,000 camshafts they know of less than ten cases in which the holding pins have sheared or become loose giving a percentage of failure of less than .005 per cent.

Lubrication is by force feed. The oil is carried in a reservoir beneath the crankcase. A gear pump driven off the camshaft forces the oil through a long horizontal tube from which it is distributed to the two end and central main bearings and to the timing gear case. From the bearings to which the oil is pumped it passes by means of the hollow crankshaft to the other main bearings and to the big end bearings of the connecting-rod. At each of these points there is a hollow core through which the oil is forced to the bearing surfaces. The connecting-rods carry leads up which the oil passes to the wristpin bearings and through the hollow wristpins to the walls of the cylinders. On the end of the horizontal main oil lead, there is a pressure gauge which registers the pressure under which the oil is being fed. This system is designed to be positive and to vary uniformly with the speed of the motor. While there is no splashing of the oil all the interior parts of the motor are reached by the



Mounting of the generator and cranking motor

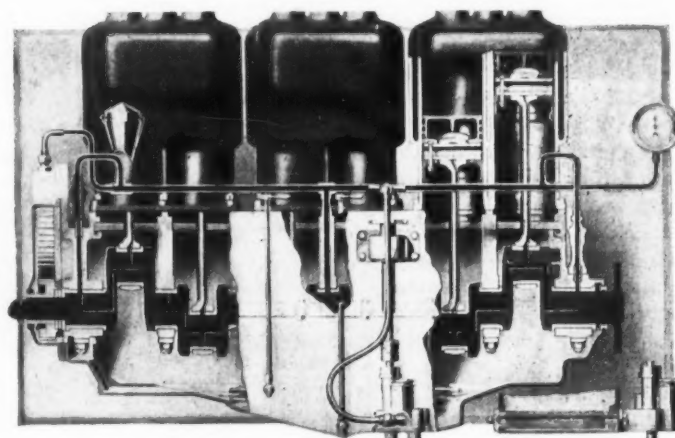
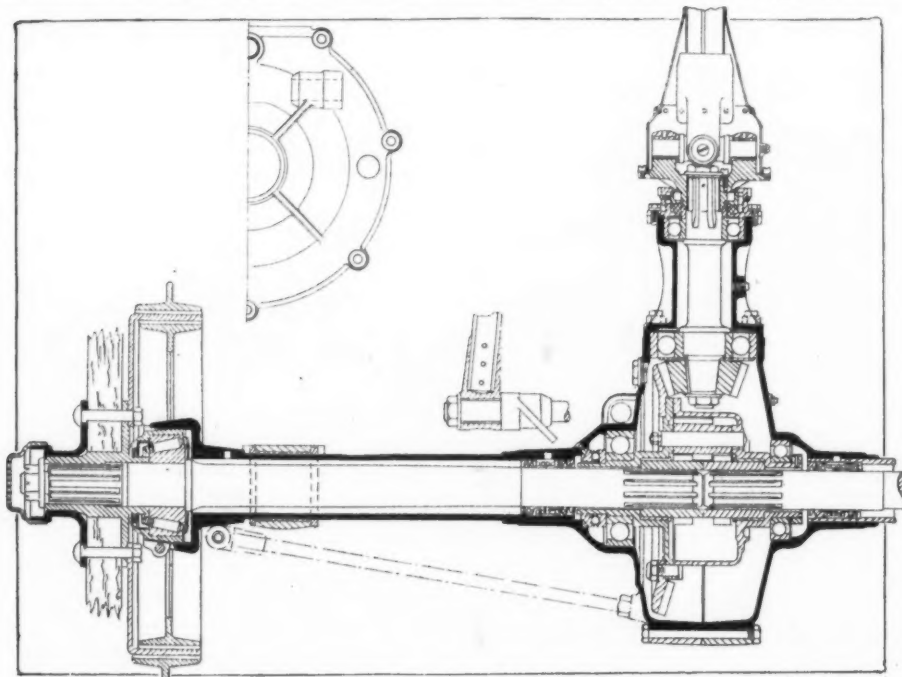


Diagram of the Pierce oiling system

spray thrown off by the connecting-rods through centrifugal force.

The electrical equipment includes a starting and lighting system and two independent ignition systems. Starting and lighting are taken care of by a Westinghouse two-unit outfit which operates at 6 volts. All the wiring throughout the car is done by the single-wire system, the return conductors being carried in copper tubes attached to the frame. The ground connections are soldered to the copper tubes and in connection with the chassis frame form the feed conductors of the circuits. An over-running clutch breaks the connection between the cranking motor and the engine when the crankshaft is driven under the impulses of the engine. A feature which is of importance in the installation of the starting system is the incasing of all electrical units such as the gears, shifting rods, starting switch, etc. The main source of ignition current is provided by a Bosch magneto, while for the secondary ignition system the storage battery is used as a source of current supply through separate induction coils and commutators.

The gasoline system has been entirely revamped. The carburetor is the same in all essential details but the jet sizes, for instance, had to be changed in shifting from the gravity to the



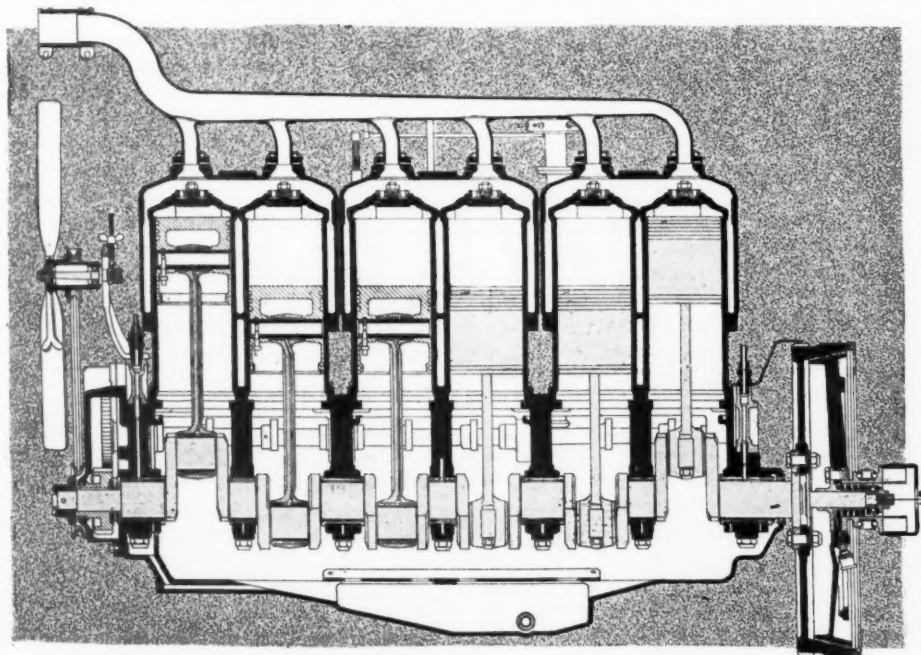
View showing the construction of the semi-floating rear axle

pressure feed. Owing to the higher position of the carbureter there is no possible danger of recondensation of the fuel in the upper part of the manifold and the result has been a car with a much quicker pick-up than previously. The Pierce gasoline tank will now be found on the rear of the car and the objection to this position, namely, its liability to damage, has been answered by the application of the rear bumper.

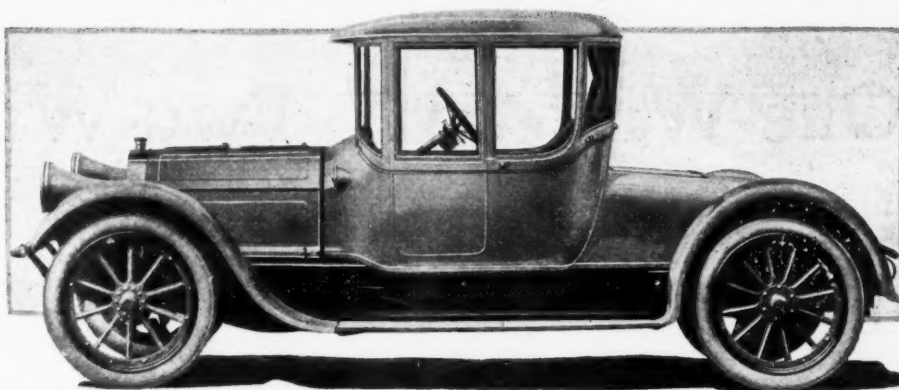
Power is transmitted from the motor to the running gear through a cone clutch. Pierce clutch design is distinctive in that it is kept constantly lubricated by means of an oil ring so designed that a small quantity of neat's foot oil is held constantly in contact with the leather. In order to gain additional smoothness, flat springs are placed beneath the leather surface of the clutch.

Four speeds are provided. The gearset is a sliding selective design held in an aluminum alloy case. This case is divided into two separate sections to permit of ease in assembly and to cut down to the limit repair costs. The gears are carried upon cylindrical six-spline shafts and the material of which they are made is chrome-nickel steel. In finishing these gears they are held to a limit of .0005 inch in order that the total backlash through the entire train of gears is a minimum. An interlocking device is also fitted which renders it impossible to change speed while the clutch is engaged. The same interlock also prevents two gears from being meshed at the same time. An air pump for inflating tires is connected through a clutch to the gearbox countershaft.

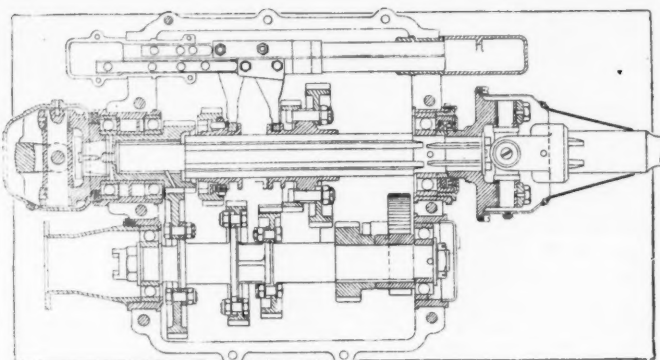
The shaft drive is provided with a universal at both ends and also a sliding joint at the rear to compensate for the vertical free motions. There is a torque rod also for taking the drive and this is fitted with a spring cushioned and swivelled front support and a pivoted rear connection to take all the torsional strains. The order in which the drive is taken through this transmission scheme is first through the front universal joint, then through the shaft, sliding joint, rear universal joint, beveled pinion shaft and then through the beveled pinion and gear into the differential.



Section through the motor showing details of construction



Side view of the latest design in Pierce coupés



Constructional view of the gearbox

The universal joints are of the cross and yoke type with nickel steel pins, steel yokes and bronze bushes. The rear end of the driveshaft is hollow and splined, the splines sliding in corresponding flutes in the rear universal joint, thus providing the compensation for the rising and falling of the chassis due to the action of the rear springs. Lubrication of the sliding joint is provided by means of a charge of grease which is contained in the hollow end of the drive-shaft.

The beveled pinion shaft housing is entirely separate from the main axle housing, but it is bolted securely to the latter. The pinion shaft is carried on two annular ball bearings designed to take both radial and thrust reactions from the bevel pinion. The bevel gears are of chrome-nickel steel.

The rear axle is a semi-floating design, the axle shaft being of chrome nickel steel and ground to size in order to give it the maximum torsional strength. The axle housing, incasing the driving shafts, is of nickel steel, brazed and riveted into the pressed steel housings inclosing bevel gear and differential assembly.

The front axle is an I-beam having a long drop which commences directly at the steering knuckle and sweeps into the center of the axle in a gradual curve. The steering torque rod is at the level of the lower part of the axle and the steering gear itself is a multiple screw and nut type of semi-irreversible design. The gear ratio of the steering gear is such as to provide a reduction of 1.5 to 1 in favor of the driver.

Equipment is more luxurious than
(Continued on page 330.)

One-Wire vs. Two-Wire Systems

By W. H. Conant

Member Electrical Equipment Division Society of Automobile Engineers

THERE is danger that serious misunderstanding may arise concerning this problem of proper wiring systems for gasoline cars. There are really two questions:

- 1—SHALL THE S. A. E. ADOPT ANY STANDARD FOR WIRING SYSTEMS?
- 2—SHALL THE STANDARD WHEN ADOPTED CALL FOR A REGULAR DOUBLE-CONDUCTOR WIRING OR A SINGLE WIRE WITH GROUNDED RETURN?

First, then, why should the Society—which is equivalent to saying the automobile industry—adopt *any* wiring standard?

The use of electric wires in motor cars has been a gradual evolution from the period in which ignition was obtained solely from dry cells and spark coil. Plain "Annunciator wire" was used with its cotton thread covering dipped in paraffin. It is a far cry from that to the present-day method of installing the best rubber-covered stranded cable in metal conduits with junction boxes and other approved fittings.

Standard Lamp Base

That lamps and sockets might be had in the open market at better prices, a standard form of lamp base was adopted with uniform dimensions. As in the case of all adopted standards, this brought out considerable difference of opinion and agreement was reached only after consideration of all viewpoints.

Difficulty has been experienced in obtaining proper insulation for two contacts in these standard receptacles but as it has developed that there is ample room to thoroughly insulate and connect *one* conductor in the space allowed, many car makers have ordered lamps and sockets so designed.

We have, therefore, many thousands of lamp bulbs and receptacles in use of both kinds which are not, of course, interchangeable. Car owners are not able, as a result of this situation, to obtain lamps or other electrical fittings with as great facility or economy as if there were but one standard.

As improved economy in design and manufacture is an aim of the S. A. E., it would seem entirely proper that it *do* adopt a standard as outlined.

The Short-Circuit Argument

Consider the arguments advanced in favor of each system over the other:

Those who oppose the one-wire plan base their objections largely on the matter of safety from fire. They contend that with the entire frame and body acting as one of the two conductors, or being in such electrical contact that they *may* so act, the danger from short-circuit is very great. If a short-circuit occurs with the large current-carrying capacity formed by the frame and large wire, the storage battery capacity is such for short periods that very serious arcs, or flashes of electrical fire, may be formed and the car destroyed by fire or the individual injured.

The claim is made that many chances are offered for producing such short circuits by means of a wrench or screw-driver in attempting to make connections or adjustments. It has even been said that the chances of accident are not twice as much with one-wire, as with two, but *fifty* times as great. The figure fifty, of course, is used arbitrarily to emphasize the point, as much difficulty would be experienced in trying to determine the exact value of this factor.

Exponents of the two-wire plan claim that the history of electrical development proves the wisdom of double conductors and that the exceptions of street railways and third-rail locomotives, which use grounded returns, are irrelevant comparisons because the apparatus is cared for and operated only by trained men.

Two-Wire Arguments

They further state that users of single-wire outfits have found it necessary to install fuses in all their circuits and point to this as a proof of danger to be encountered.

A further claim is that if lamp brackets become loose, poor contact results causing lights to flicker. This assumes that brackets really carry current as part of the return circuit. It is also said that with so-called dual magnetos a grounded return scheme is not practical.

So much, then, for one side of the case and it should be noted that the writer is not expressing an opinion either way in this article but is endeavoring to make clear the opposing views and reasons therefor. In no report of the recent discussion at Cape May has there been presented the real reasons in *favor* of single-wire systems and one publication has gone so

far as to use its editorial columns against *any* standard. Because of the unfortunate hour at which this matter was discussed and the small attendance at that late hour, very little of the reasons *favoring* one-wire were presented at the S. A. E. Summer Meeting.

Economy a Factor

No electrical man approaches this subject with any leaning toward grounded circuits. It smacks too much of call-bells, gas lighting and self-winding clocks—that is to say, crude beginnings of a great art. It is evident that good reasons must have convinced those electrical engineers who now favor this form of wiring for automobiles. That motor car makers, mechanical engineers and business men should favor it has no bearing on the merits of the question, for they may consider *only* economy. If, however, economy means manufacturing facility and production stimulant, their views become increasingly vital.

Socket Small for Two Wires

THE TWO-WIRE PLAN IS OPPOSED BECAUSE OF THE CLAIM THAT IT IS NOT POSSIBLE TO HAVE WORKMAN-LIKE CONNECTIONS AND PROPER CONTACT IN PRESENT SOCKETS WHERE TWO CONDUCTORS MUST BE HANDLED IN SUCH SMALL SPACE.

Much trouble is experienced in making the original installations and in keeping it free from defects in service. If a corresponding amount of trouble were given by ignition or carburetion, it must be admitted that co-operative efforts to correct it would be welcomed by all concerned. Such trouble is not found, however, where a single contact is used in this same socket. Ample room is left for proper insulation and for making a substantial wire connection.

Both Need Fuses

With two conductors so close together as is necessary in the space allowed, the ease with which a short-circuit may be found is striking. In fact, it is extremely difficult *not* to cause a short-circuit with screw driver, soldering iron or other tool in working on the apparatus. This shows that the danger from fire is present with *either* system and leads to the point that fuses should always

be used regardless of the type of wiring. The need for fuses, then, with one-wire system is no argument against it and the neglect of two-wire advocates to recognize the need of fuses in their outfits is no reason for overlooking the importance of this safeguard.

Lamp Brackets No Carriers

It is commonly understood by "grounded-return" that current is conducted to the lamp, or other device, by a single wire and returns thence through the bracket and frame. Present day systems have modified that plan so that only the name remains. The wire is carried in a metal conduit—preferably copper—from which it is properly insulated. This conduit is in itself the return conductor and is only grounded, or connected to the frame, to prevent any potential difference between it and other metal parts of the car. From this it is evident that lamp brackets do *not* carry current and would not cause the lights to flicker by becoming loose.

Larger Wires Possible

As large wires are necessary to avoid appreciable drop in voltage between battery and electrical devices, the use of one wire permits of a large one being installed in a conduit of reasonable size. To use two wires of

this desirable size would require a much larger conduit. The difference in cost would be determined partly by the extra wire and partly by the more expensive conduit. The ease with which connections are made to sockets is a further advantage.

Might does not make right but it is claimed that a decisive majority of automobile manufacturers has adopted the one-wire system and an overwhelming percentage of all 1915 cars will be thus equipped.

The purpose of this article is to focus attention upon the subject that it may receive the attention necessary to a proper decision when next it is considered for action. NOTHING CAN BE GAINED BY CONTINUING BOTH SYSTEMS TO THE DISADVANTAGE OF PUBLIC AND PURCHASING AGENTS ALIKE AND THE EARLY ACCEPTANCE OF ONE AS RECOMMENDED PRACTICE WILL SIMPLIFY A NUMBER OF PROBLEMS.

The S. A. E. Committee's Object

It should be stated that the Electrical Equipment Division of the S. A. E. Standards Committee did not expect to rest content with the simple recommendation for a particular system. It looked upon this action as the first step in a program of suggesting improved details of sockets, contacts and other items included in wiring outfits. If it could be under-

stood how thoroughly this committee had canvassed the entire situation, approaching it without any preconceived prejudices, more consideration would be given its report. That the question has been up for over 2 years with many discussions by able, competent and experienced engineers from all branches of the industry, should carry weight with those who may have considered the subject but superficially and briefly.

Motor Comparisons Absurd

The statement that a six- or a four-cylinder motor might as well be proposed for standard practice is little short of absurd, even for an exaggerated illustration. The history of motor car standards is replete with similar objections to every advance that has been made. It is well to bear in mind that while an active opposition or minority, is necessary to keel the majority working along the right lines, no opposition is ever *constructive*. No amount of selecting things *not* to standardize will help in any way the great work the Society has been and is doing. No industry has ever been so benefited by co-operative labors nor has it ever been thought possible to so discuss, compromise or standardize details and methods as has been the case in this American automobile industry.

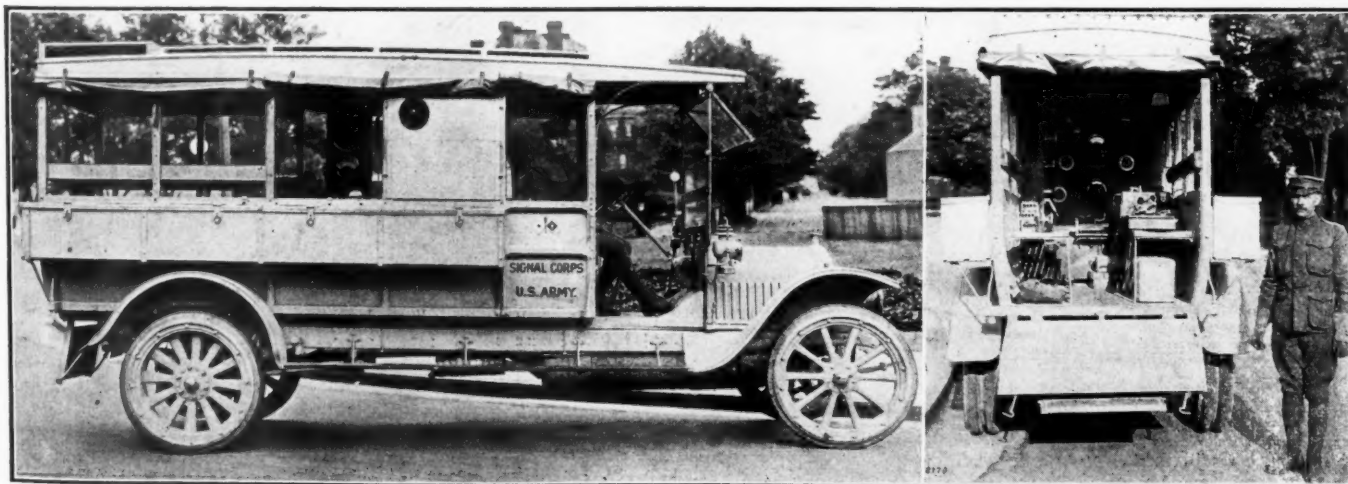
800-Mile Wireless Outfit on White Truck

A portable wireless outfit that can be set up in 12 minutes and is capable of sending messages over a radius of 800 miles under favorable conditions and receiving messages from points 2,500-miles distant, has been built for field service in the United States Army by the White Co., Cleveland, O.

Umbrella-type antennas are used, this part of the outfit being mounted at the top of an 85-foot mast which is built in nine sections. The top section is raised by hand but the others are hoisted aloft by a block and tackle suspended from struts mounted on a platform on the roof of the truck. These struts are quickly detachable when not in use. The guy wires are attached to the fifth section of the mast. When disassembled, the nine sections are carried in compartments built along each side of the truck. The counterpoise or ar-

tificial ground, consists of a heavy insulated wire. For convenience in grounding, there is a socket on the outside of the truck body into which a ground-wire fits.

The great range of the new equipment and the speed with which it may be brought into action is due to the employment of a powerful electric generator driven by the gasoline motor through a train of gears. The generator delivers electric current of 500 cycles at 110 volts and has a capacity of from 18 to 32 amperes. This current is interrupted by a relay, operated by the sending key, and is transformed so that it leaves the truck at a pressure of 22,000 volts and an amperage varying 8 to 12. As the current rises to the top of the antennas the voltage rises to approximately 90,000, while the amperage approaches zero.



Special White truck for carrying a portable wireless outfit in the Signal Corps of the U. S. Army



Fig. 1—Ingenious method of spreading gravel

EDITOR THE AUTOMOBILE:—The cost of garaging is the greatest factor hindering the extended use of the small car and cyclecar in the city, and the solution of the problem would seem to be separate garages for these machines.

Garage rent is now the largest item in figuring the cost of operation, and it is therefore important to reduce this to a minimum. It is of greater moment than fuel or tire economy.

The objection to storing these small cars in garages that are designed for automobiles of all sizes is that the floor space is so laid out that the small machines take up just as much space as the large ones. The ordinary garage is laid out into a certain number of rectangles, each one of which is of sufficient size to accommodate the largest car, and therefore a cyclecar with 36-inch tread and 100-inch wheelbase will occupy this space sufficiently to prevent any utilization being made of the remainder of it. For this reason the garage proprietor is reluctant to reduce the rental he has set for this space, although he will to a certain extent, especially if he is anxious to get the business, because the average owner has an idea that the amount paid should be proportionate to the size of the car, not thinking that the small machine takes up as much room as the large one.

The answer to this problem is special garages, or special floors in the garages now in use, for the accommodation of small cars exclusively, and the floor space can be laid out accordingly, the spaces being both narrower and shorter. Then the rental can be reduced proportionately with the result that many of us who are wondering whether we can afford a small car or a cyclecar will then feel able to stand the expense.

New York City.

CYCLECAR.

Motor, Long Idle, Balks

EDITOR THE AUTOMOBILE:—I have a six-cylinder motor which has just been carefully overhauled and placed in first class condition, but I cannot get a single explosion, even on a prime subjected to a good hot spark. This engine has been idle for nearly a year and in this time has probably gone stale. I feel that all it needs is a few explosions to warm it up and lend it a little life. What I wish to find out is if you know of any chemical, such as ether, that would explode very easily. If so what are the proper mixtures. The method I use to turn this motor over enables me to spin the engine at one-third the speed that I turn the crank. Is this too slow?

New York City.

WALTER BOWLES.

—Ether vaporizes more readily than gasoline, but for that matter you might use acetylene gas.

However, your motor should start readily on gasoline and there is no reason for using ether, acetylene gas or some other

The Rostrum

Special Small Car Garages Will Reduce Rent

makeshift in warm weather, although there might be in cold.

It would seem that the reason your motor refuses to start is that you crank it at too low a speed. With the crank attached directly to crankshaft, spin the motor after priming the cylinders with gasoline.

Possibly the spark plugs are dirty or moist so that the sparks are short-circuited. Clean the spark plugs thoroughly in this case. Also see that the carbureter is in adjustment.

There is no such thing as a motor going stale and with a good spark in each cylinder and a proper mixture your motor should start without trouble.

Simple Method of Spreading Gravel

EDITOR THE AUTOMOBILE:—Fig. 1 shows a simple method that I saw employed recently to spread gravel or crushed stone to an even depth. This saved two or three laborers. The truck is a 5-ton Peerless with dumping body.

The device is a catch, made in a blacksmith shop, which will permit the truck tail gate to swing open only a certain number of inches. It has three steps, one of which spreads the load, with the truck in first speed, at a depth of 6 inches, another 8 inches and another 10 inches. It works equally well on up or down grade or on the level. The accompanying photograph shows the results that are obtained.

Bexar, Tex.

H. A. CALMAN.

How to Adjust Rayfield G

EDITOR THE AUTOMOBILE:—Will you please give me a full description of the adjustments of the new G3 Rayfield carbureter?

South Bethlehem, Pa.

SUBSCRIBER.

The adjustment of the new G3 Rayfield resembles largely that of the model C described in *THE AUTOMOBILE* for July 16, 1914, the difference being that there is no air-valve adjustment. All model G carbureters are the same, the numeral appended indicating the size.

When adjusting a Rayfield carbureter, Fig. 2, bear in mind that all adjustments are turned to the right for a richer mixture.

Before adjusting the carbureter be positive there are no obstructions in the gasoline line; that manifold connections are absolutely tight and free from air leaks; that valves and ignition are properly timed, and there is a hot spark and good compression in all cylinders.

With throttle closed and dash control down, close the nozzle needle by turning the low-speed adjustment to the left until block Y slightly leaves contact with the cam M. Then turn to the right about one and one-half turns. Open the throttle not more than one-quarter. Prime the carbureter by pulling steadily for a few seconds on the priming lever G. Start the

motor and allow it to run until warmed up. With retarded spark, close the throttle until the motor runs slowly without stopping. Turn the low-speed adjustment to the left one notch at a time until the motor idles smoothly. If the motor does not throttle low enough, turn the stop arm screw A to the left until it runs at the lowest number of revolutions desired.

Then advance the spark about one-quarter and open the throttle rather quickly. Should the motor back-fire it indicates a lean mixture. Correct this by turning the high-speed adjusting screw to the right about one-quarter turn at a time until the throttle can be opened quickly without back-firing. Should the motor not back-fire, turn the high-speed adjusting screw to the left until it does. Then turn to the right until the motor runs smoothly and powerfully.

Adjustments made for high speed will in no way affect the low speed. If loading (choking) is experienced when running under heavy load with throttle wide open, it indicates too rich a mixture. This can be overcome by turning the high-speed adjustment to the left.

The low-speed adjustment must not be used to get a correct mixture at intermediate or high speeds. The automatic air valve should always be seated when the motor is throttled down to its lowest speed.

Before starting the motor when cold observe the following instructions: Open the throttle not more than one-quarter (if opened more starting will be difficult); enrich the mixture by pulling up the dash control; prime the carbureter well by pulling on priming lever G for a few seconds. When stopping the motor pull up the dash control. Open the throttle about one-quarter and switch off the ignition. This leaves a rich mixture in the motor, which insures easy starting.

Why Racers Use Castor Oil

Editor THE AUTOMOBILE—I notice that in the racing events both here and abroad the cars use castor oil as a motor lubricant. What advantages, other than less smoke, has this oil?

Leesburg, Fla.

W. H. HOWELL.

—Castor oil has a greater viscosity than any other oil, used for motor lubrication, at the high temperatures experienced in racing motors. Therefore it helps to prevent the passage of the gases past the piston and the flow of the oil up into the combustion chamber, where it would burn and cause smoke. Since very little of the castor oil makes its way up to the combustion chamber, there is very little that is burned, but most of it is used for lubrication with the secondary advantage that much less oil is necessary.

It is not advisable to use this oil in everyday work, however, because it causes a heavy carbon deposit.

According to Professor F. Bendemann, in reviewing the

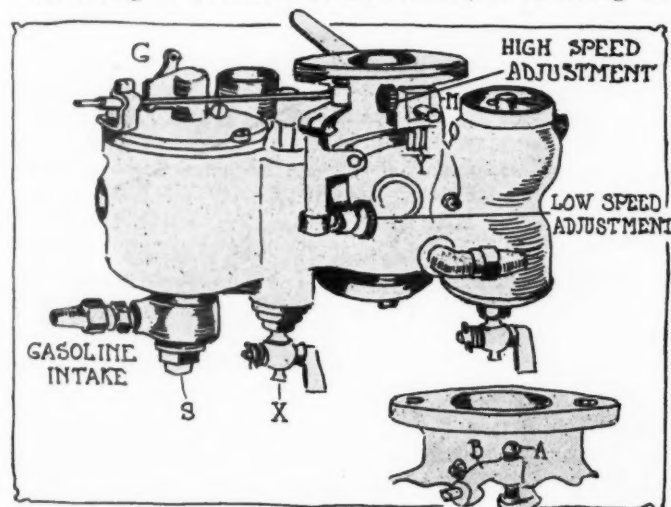


Fig. 2—New Rayfield G carbureter, showing adjustments

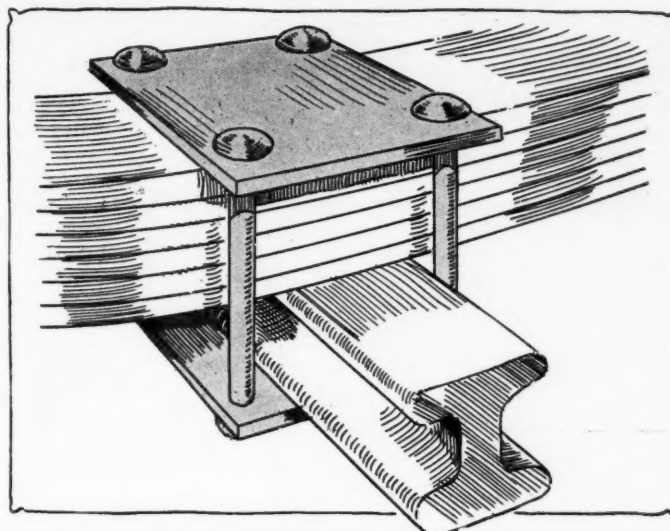


Fig. 3—Simple substitute for broken spring clip

progress in motor construction by the German builders, "at high temperatures castor oil retains its viscosity and lubricating properties considerably better than good mineral oil, as shown by the tests summarized in the appended table:

	Minimum Heat Units per kilogram	Viscosity in Engler Degrees at temperatures centigrade		
		60 deg.	100 deg.	120 deg.
Mineral oil, No. 1.....	10,116	3.37	1.65	1.41
Mineral oil, No. 2.....	10,080	2.75	1.46	1.20
Castor oil	8,298	10.72	2.72	1.95

"Castor oil is therefore still indispensable for air-cooled motors, but for the water-cooled motors at the contest one or the other of the two mineral oils referred to in the table was always sufficient."

Substitute for Broken Spring Clip

Editor THE AUTOMOBILE—A simple method of mending a broken spring clip is shown in Fig. 3, and as it saved me from being held up a long time on the road it is possible that it will be of service to some other motorists.

While touring in New England recently I noticed that the car developed a tendency to run to one side of the road, and finally it got so bad that I stopped to examine. I found that the right spring bolts holding the clip had given away and allowed the axle to slip back several inches.

There was a small village not far away and I drove the car to it slowly, and I had a blacksmith take two flat pieces of iron 1-4 inch in thickness and about 3 inches square and drill a 1-4-inch hole in each corner. Then I got four 1-4-inch carriage bolts about 8 inches long and improvised the spring clip shown.

Determination of Car's Age for Insurance

Editor THE AUTOMOBILE:—As the insurance rates on automobiles rise with the age of the car, when is a 1914 car purchased in July one year old, if the makers announce their 1915 model in August? What is the practice in other cities in this respect? It seems to me, that for insurance purposes, that a car's age should date from the time it is delivered to its original purchaser. The improvements on the present standardized automobile are seldom enough to make any material difference in the risk.

Pittsburgh, Pa.

MURRAY FAHNESTOCK.

—A 1914 car is one year old from the date of purchase, but a 1915 car purchased in 1914 is given a lower rate the following year than if it had been a 1914 car.

Take for example a 1913 \$2,000 car purchased in July, 1913, then the premium for insurance against fire and theft would be 2 per cent. the first year. The following year this

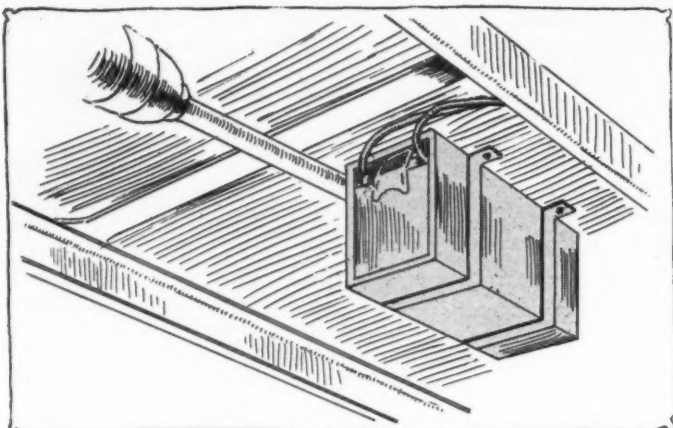


Fig. 4—Method of suspending battery from tonneau floor

car would be insured for 80 per cent. of its purchase price, or \$1,600, and the rate would be increased to 2.75 per cent.

But if this car had been a 1914 car and had been purchased in July, 1913, although the premium the first year would have been the same as before, the second year the rate would have remained at 2 per cent. of \$1,600, instead of rising to 2.75. In other words, the payment on the 1914 car for the second year would be two-hundredths of \$1,600, or \$32, while the premium on the 1913 machine would be two and seventy-five one-hundredths or \$44. These rules apply to the principal companies all over the country.

Peculiar Play in Steering Gear

Editor THE AUTOMOBILE:—Will you please tell me in your next issue how to take up the play in the steering gear on a 1911 Model 30 Oakland. It is not in the steering knuckles or the drag link nor is it in the gear housing. Can it be taken up?

Isanti, Minn.

EDWIN BOSTROM.

—It may be that the tie rod pins are loose, that the wheel bearings are worn or that the steering arm attached to the shaft running from the steering gear housing is loose. This shaft is squared and the arm is clamped in place over it. If the arm is merely loose, you should be able to tighten it by turning up on the nut, but if the play is very great a new part may be necessary.

Data on Design of Small Motor

Editor THE AUTOMOBILE:—I am designing a small gasoline engine, air-cooled, two-cylinder, vertical four-cycle, with 3-inch bore and stroke, to run at about 2,000 revolutions per minute.

1—What compression would it be best to figure on getting?

2—What size should the bearings on the crank and camshafts be, both diameter and length? Would three bearings on each be best? Would first-class babbitt metal be satisfactory?

3—What kind of steel is it best to use in the cams? How are they fastened to the camshaft and can they be fastened so as to be adjusted to different timing?

4—Would you advise roller or flat-ended push-rods?

5—What size and of what steel should the valve stems be with 1.5-inch valves?

6—Would the fact that the explosions occur irregularly, that is with intervals of 180 degrees and then 540 degrees, be objectionable?

7—Do you think that provision for cooling the lubricating oil would be of value?

Glen Ridge, N. J.

PERCY S. WILSON.

—1—Make the compression 40 pounds.

2—Three bearings would be better than two for a motor of this speed. Make the crankshaft bearings 1.25 inches in diameter and 2 inches long, or longer if you do not have to consider the overall length of the motor. The camshaft should also have three bearings 2 inches long and 1 inch in diameter. Babbitt metal should be satisfactory.

3—Three and one-half per cent. nickel steel should be used. The cams should be pinned and keyed. It would be better, however, to make the cams and the camshaft in one piece as it is difficult to hold the cams securely. The timing can be varied by changing the meshing of the camshaft gear with respect to the crankshaft gear.

4—Use push-rods with roller ends.

5—The valves may be made of nickel, carbon or tungsten steel. Satisfactory valves should be obtained from any reputable manufacturer.

6—The irregular explosions offer a slight objection but it is not serious. Many motors of this type have been built in the past. It is better to do this than to have both pistons on the same crank throw, which would be required if the explosions occurred at equal intervals.

7—The operation of the motor would be slightly improved by cooling the lubricating oil.

Why Spacers Are Used in Annular Bearings

Editor THE AUTOMOBILE:—Why is it that spacers are placed between the balls in an annular ball bearing, but not in a cup and cone type? I should think it would make a stronger bearing if the race were completely filled with balls.

Los Angeles, Cal.

J. W. BAER.

—The reason for this is simple. It is impossible to insert more balls in the annular type without cutting away a piece on one side of one race, thereby weakening the construction.

The method of inserting the balls is shown in Fig. 5, where it will be noted that the inner and outer members are placed eccentrically and the balls inserted, and then the balls are kept equal distances apart by spacers.

If a full race of balls is used, however, a notch for inserting the balls must be made and while a piece is put in to fill up this opening it is a source of weakness.

Place Battery Under Floor Boards

Editor THE AUTOMOBILE:—I have an S. G. V. 1910 model and would like some advice as to the best location for a storage battery for an electric horn. The running boards are not available because a large tool box is carried on one side and the spare tires are on the other. Nor do I see how it can be placed under the seats because the gasoline tank is under the front one and the back one is too shallow.

New York City.

R. P. W.

—The only solution seems to be to suspend it under the floorboards of the tonneau, as indicated in Fig. 4. Have a wooden box made just large enough to contain the battery and then have a blacksmith bend up two strips of iron to go around the container and bolt to the floor. The iron may be any convenient section, such as 1-8 inch by 1 inch. Have the bands made a little small so that they will fit snugly.

The battery may be held from slipping out of the open end by barring the opening by means of a bolt. If the closed end of the battery box is placed forward sufficient protection against mud, dust and grease will be afforded.

Weights of Pierce-Arrow Cars

Editor THE AUTOMOBILE:—In your issue of July 23 you gave a table of comparative weights of the Pierce, Packard and Peerless cars, in answer to a correspondent's inquiry. The correspondent, however, asked for the weights of these cars with the tanks empty, we presume he means without

water in the radiator and without gasoline in the tank. These weights are at variance with our figures. The 38-horsepower is the most out. The weight of our 38-horsepower 1915 model is 4,263 pounds, the 48-horsepower is 5,050 pounds and the 66-horsepower is 5,450 pounds. These weights are for cars fully equipped with gasoline tank and radiator full, and also include two spare rims on the running board, four shock absorbers, a full set of tools with spare cans of oil and grease, one man top and glass front. The 38-horsepower is our five-passenger model and the 48- and 66-horsepower are our seven-passenger models. The weights of these cars fully equipped but without water and gasoline are:

38-horsepower, 4,057 pounds.

48-horsepower, 4,776 pounds

66-horsepower, 5,171 pounds.

We, as a rule, do not care to give the weights of our cars for the simple reason that our customer is apt to compare these weights with those given by other manufacturers and these weights may not include such equipment as we supply and may be without water and gasoline. Then again it must be remembered that our gasoline tanks are larger than some of our competitors, our 38-horsepower carries 26 gallons and the 48- and 66-horsepower carry 32 gallons.

These weights often show up to disadvantage and we think that in comparisons of this kind every feature should be the same in both cases, otherwise these comparisons are of no value.

Buffalo, N. Y.

D. FERGUSON,

Mechanical Engineer Pierce-Arrow Motor Car Company.

The Chemistry of Combustion

Editor THE AUTOMOBILE—1—Will you please explain the chemical action that takes place in an automobile motor when the spark ignites the charge. Kindly use simple language as I am not a chemist.

2—Also state what effect the presence of moisture has on this action.

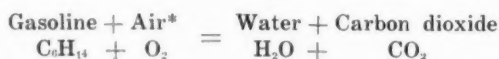
St. Paul, Minn.

R. J. FOWLER.

—1—Assuming a perfect mixture, when combustion takes place when the spark occurs what actually happens is that the carbon and hydrogen, the elements in the gasoline, are reacted upon by the oxygen in the air in the cylinder, with the result that part of the oxygen combines with all of the hydrogen to form water and the rest of the oxygen combines with the carbon to form carbon dioxide. Directly after combustion the temperature of the gases is so high that the water is in the form of steam, but by the time it passes out of the exhaust pipe into the atmosphere it is merely vapor in the exhaust products. The nitrogen in the air remains neutral, that is, it is not affected by the combustion, but is merely heated up.

Gasoline is a combination of several oils forming a series that has the general chemical formula C_nH_{2n+2} , but for simplicity it will be assumed that gasoline is composed entirely of hexane, which contains 6 atoms of carbon combined with 14 atoms of hydrogen; this is expressed by the simple formula, C_6H_{14} .

Then combustion may be represented by the following equation:



*Only one-fifth of the air is oxygen, the remaining four-fifths consisting of nitrogen and other inert gases, but these may be disregarded as they have no effect on the chemical action.

The above equation only holds good providing the mixture is perfectly proportioned and absolutely homogeneous. If there is too little air the combustion will not be complete and the result will be that there will not be enough oxygen to completely burn the carbon or the hydrogen in the gasoline.

If there is just a little air lacking the result will be that there will not be enough atoms of oxygen to combine with all the carbon atoms to make carbon dioxide, CO_2 , and therefore some of the molecules will have an atom of oxygen missing, that is, CO or carbon monoxide will be formed. With still less air it might happen that some of the atoms of the carbon in the gasoline could not find any oxygen to unite with, with the result that they will remain as carbon, and it is these small particles of carbon that indicate too rich a mixture by turning the exhaust into black smoke.

Too little air might leave some of the hydrogen atoms in the gasoline without any oxygen to combine with, and therefore some free hydrogen might be found in the exhaust.

With too much air there would be some free oxygen in the exhaust.

These remarks are assuming that the gasoline is perfectly vaporized and that the mixture is homogeneous. It is easily seen, however, that part of the charge might be too rich and another part weak, with the result that all the exhaust products mentioned will be found in the exhaust gases at the same time.

Suppose that the gasoline did not vaporize readily. Then part of the fuel would be carried into the cylinders in small globules. In the vicinity of these globules the mixture would be very rich, while some place else it might be weak.

2—The addition of water to the charge has no effect unless sufficient is added to absorb an appreciable amount of heat. When combustion takes place the water is turned into steam, and then as the temperature rises the steam is broken up into its constituent elements, hydrogen and oxygen, and a certain amount of heat is absorbed by these gases when this change takes place. Then as the temperature drops the hydrogen and the oxygen unite again to form water, and the same amount of heat is given off, so that the change does not affect the amount of heat produced nor does it change any of the gases.

Oil Trouble Caused by Wear

Editor THE AUTOMOBILE:—I have a 1914 Ford to repair and the front cylinder gets too much oil. It works all right when it has a clean plug, but after running about 100 or 150 miles, it misses. Can you give me some idea as to what the cause of the oily cylinder is?

Bath, Mich.

ALBERT DETLUFF.

—The trouble is undoubtedly due to a worn cylinder piston or rings or to the openings in the three rings being in alignment. An inspection of this cylinder should show where the trouble is and if the piston or rings are worn they should be replaced.

The missing, of course, is due to the plug becoming fouled with oil.

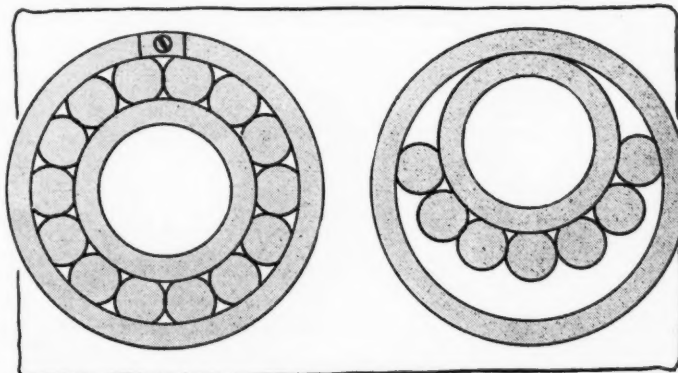


Fig. 5—Two types of annular ball bearings to show method of assembly. At the left is a full race and in order to insert the balls a part of the outer race is removable. If the races are made solid, then fewer balls must be used so that they can be inserted by placing them eccentrically, as at the right



The Engineering Digest



Design Features of Single-Valve Gnome Motor in Which Speed and Power Are Regulated Through Exhaust

CRANKCASE USED AS RESERVOIR FOR RICH, INEXPLOSIVE FUEL VAPOR CONSTANTLY RENEWED

SINCE it was found that the type of motor developed by the German Daimler company for aviation purposes (features of which were described in THE AUTOMOBILE of October 16 and 23, 1913) was also used in the Mercedes racing cars which carried away the principal honors in the recent Grand Prize race in France, the new features of other aviation motors are being watched more closely in the automobile industry. Even the improvements found of value for the motors with revolving cylinders, though these are still uneconomical with fuel and oil, are looked into, so as to keep account of all constructive and operative possibilities of the internal combustion engine.

In this class the Gnome has long stood pre-eminent by its performances, and a description of its latest model, the *monosoupape* or single-valve type, and the method for obtaining speed and power variations by varying the stroke of the exhaust valves, will therefore be found of general interest. The description is furnished by Karl Feederle and Friedrich Hansen, residents of London, who have had ample opportunity to become familiar with the *monosoupape* Gnome and contend that theirs is the first exhaustive exposition of the important features in this motor.

Efforts to get away from inlet valves in the pistons and to effect the intake of a fresh charge at the end of the instroke of the piston, while maintaining the four-cycle principle, began with the makers of the Gnome motors in 1911, but acceptable results were not accomplished till 1913, when the first usable *monosoupape* model was shown at the Paris aero-salon. It was next exhibited at the Olympia show in March of this year.

It is a true four-cycle motor, with the difference from the usual arrangements that the introduction of fresh gas at the inner dead center of the piston takes place in this way that

the rarefied fresh air contained in the cylinder at that moment is mixed with an over-rich gasoline vapor mixture which enters through slits in the cylinder wall. All the functions are rounded up within four piston strokes.

Details of the Cycle

The working sequence is as follows: The large exhaust valve remains open for 90 degrees after the burnt gases have been expelled and during this period the piston makes one-half of its instroke, drawing fresh air through the exhaust valve and cooling the latter. The valve now closing, this air is rarefied until the piston reaches a point corresponding to 155 degrees from the upper dead center, where it passes a circle of 10 slits in the cylinder wall, each 25 millimeters long and 5 millimeters high. The over-rich vapor mixture now enters through these slits, raising the cylinder contents to atmospheric pressure and forming an explosive mixture. On the outstroke of the piston, the compression of this mixture naturally begins at the same point—now 25 degrees past inner dead center—and continues till the ignition is effected by the magneto, at any point from the outer dead center to 15 degrees before it, according to the speed of the motor. The exhaust is opened 60 degrees before inner center and the centrifugal action pushes the burnt gas out rapidly; 35 degrees further on in the course of the piston the slits come into action again and relieve whatever pressure may still be present by providing an exit to the crank chamber, whereafter the outstroke of the piston cleans the gases completely out.

The patent protection for this new construction of the Gnome motor relates mainly to the feature that the fresh gas mixture entering through the slits is so rich that it cannot normally be ignited from the burnt gas which may have entered the crank-chamber, and it is noted that the amount of such hot gas at all events must be small because the exhaust valve is opened 35 degrees before the slits. A further precaution is that the cylinder in the vicinity of the slits is provided with larger cooling-fins than are customarily used at the inner or lower ends of cylinders. In addition, the sleeves which connect cylinders with the crankchamber—B in Fig. 2—are provided with projections which serve partly to guide the portions of the cylinders which are below

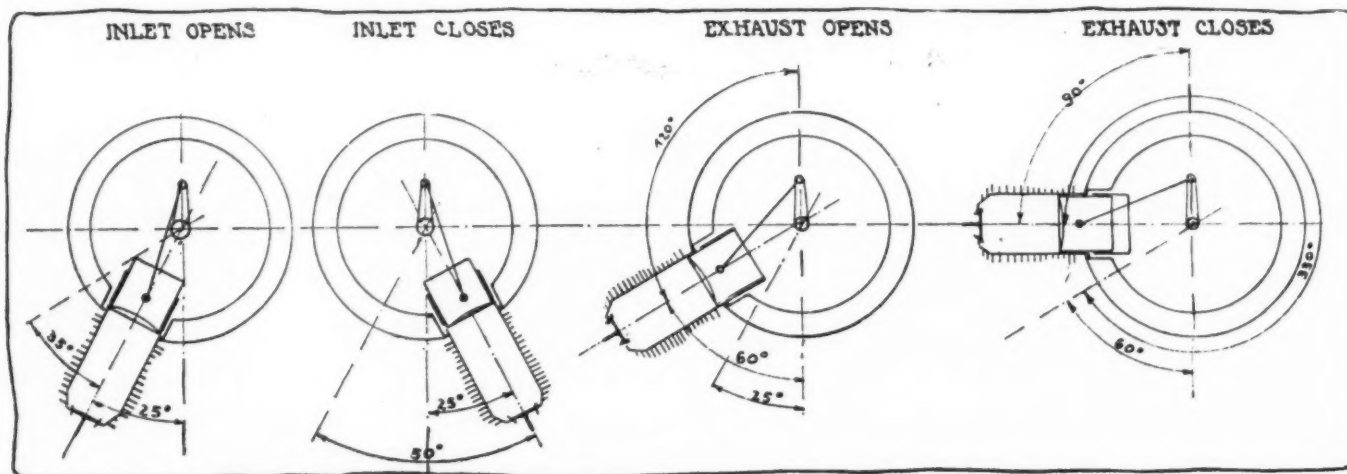


Fig. 1—Four-cycle valve-timing of new Gnome single-valve 100-hp. motor

the slits and also break up and cool the exhaust gas which may enter through the slits, so as to bring them below the temperature which might cause ignition of the fresh charge of vapor.

The arrangement of the cycle here described is illustrated in the four diagrams of Fig. 1.

Throttling by Exhaust Valve

The importance of keeping the fresh vapor so rich that it cannot be ignited made it inadvisable to attempt throttling by means of a butterfly valve acting upon a carbureter, as by this means the danger of getting too much air with a throttled charge would be obvious and the air might make the charge ignitable in the crankchamber. To control these proportions, the gasoline is taken to the motor through a small gear pump G actuated by gears from the motor, while the required air enters through the hollow propeller hub P of the motor, the stationary crankshaft remaining closed, in contrast with previous practice. In Fig. 2, which represents a section through the 100-horsepower Gnome *monosoupape* with 9 cylinders and is drawn to scale, the channel F for the gasoline from the gear pump to the gasoline jet may be followed without difficulty. The jet J, which is nothing but a small perforated tube, lies before the middle of the intake port bored in continuation of the bore of the propeller hub and the current of air carries the constantly flowing fuel with it, filling the crankchamber with the desired over-rich and non-explosive mixture. No regulation, apart from the motor speed, is provided for reducing the fuel feed.

In order to be able to vary this speed and the power of the motor the stroke of the exhaust valves has been made variable. The construction serving this purpose is shown in Fig. 3, A, B and C, diagrammatically. A1A1 is the axis of the cylinder and of the exhaust valve; *a* is the rocker arm with fulcrum at *b*, and *c* indicates the position of the rocker arm when the exhaust valve is closed; *d* is the actuating-rod and *e* the guide for the tappet-rod *f*; *l* a ring which is turnable in the valve gear casing of the motor; *g* a small lug on this ring carrying pivotally the roller *r*₂ and the sliding-piece *h* upon which the roller *r*₁ of the tappet rod runs; *n* is the cam by which the valve is controlled. The ring *l* can be turned by means of a rod *z*, the latter

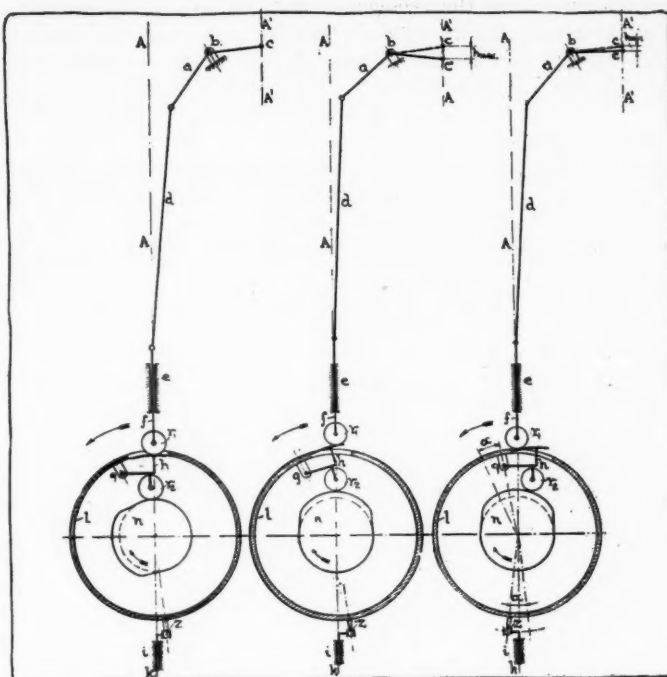


Fig. 3, A, B and C—Diagrams of variable-lever-arm system for operating exhaust valves

being first turned by the rod *k* which is mounted in the bearing sleeve *i*.

Fig. 3A shows the position of this mechanism with the valve closed, Fig. 3B with the valve opened to its maximum and Fig. 3C the same position as Fig. 3B, only with the ring *l* so turned that the valve opening is at minimum. The variation in the valve lift, as will be seen, is obtained by displacing the roller *r*₁ upon the sliding piece *h* with relation to roller *r*₂, whereby the lever arm by which the cam acts upon the tappet roller is lengthened or shortened.

Details of this mechanism can be followed in Fig. 2. Within the stationary crankshaft there is mounted a spindle *S* which at one end carries a triple-threaded screw *T* and at the other end a sliding piece *U* serving to turn a lever *V* attached to it and from the outer end of the latter extends a rod *W* which passes through the assembling-flange of the crankcase between two cylinders and serves to turn another lever *Y* to and fro, thereby turning the ring *l* as above referred to. The spindle in the crankshaft is actuated either directly by a handwheel or, as shown in Fig. 2, by a pulley operated by cables. The longitudinal movement of the spindle amounts to 20 millimeters and corresponds to a half turn of the pulley.

In practice this arrangement for throttling on the exhaust has proved extraordinarily reliable and it is possible by means of it to vary the motor speed from 300 to 1,250 revolutions.

The advantages of the construction over the prior Gnome construction consist first in dispensing with the automatic inlet valves in the pistons, so that these now can be made much lighter, and secondly in the reduced number of moved parts—one inlet valve in the motor taking the place of the many—by which the reliability of the motor has been much enhanced. It is also contended that the oil consumption has been reduced but the

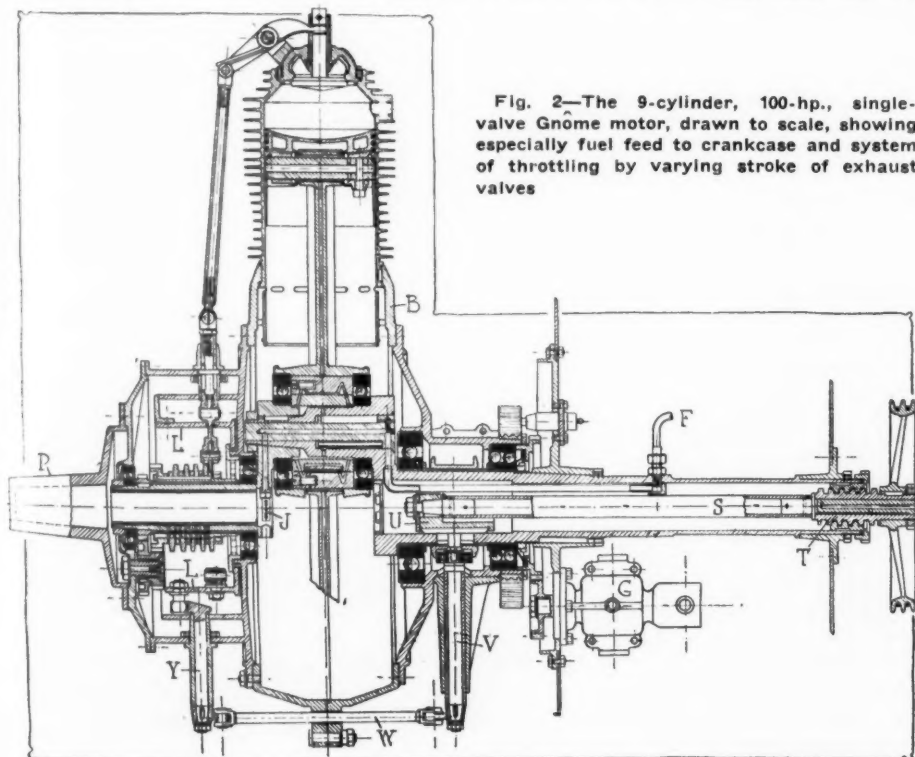


Fig. 2—The 9-cylinder, 100-hp., single-valve Gnome motor, drawn to scale, showing especially fuel feed to crankcase and system of throttling by varying stroke of exhaust valves

writers have made the experience that considerable quantities of oil are still thrown into the cylinders through the intake slits and out through the exhaust valves. The fire risk is reduced because no opening in the motor exists on the back side toward the gasoline tank. It is a disadvantage, however, that despite all caution circumstances can arise under which explosions can take place in the crankchamber; even explosions strong enough to injure the motor. They can occur when for any reason the constant flow of gasoline is obstructed wholly or in part, as by clogging of the gasoline conduit, or when the gasoline in the tank is used up to the last drop. In these cases the gas already in the crankchamber becomes explosive because air alone continues to flow into it. Usually the result is only that the motor stops, but there is at any event an injurious effect upon pistons and joints.

The workmanship of the *monosoupape* model shows plainly the great experience gained at the Gnôme works. Some of the measurements are therefore interesting. The cylinder walls, turned from a good cast steel, are 2 millimeters thick. The crankcase is a very clean-lined sheet steel stamping

made in two halves with turned-out bays for the cylinders. When the crankcase is assembled the cylinders are wedged into these cut-outs and keyed against turning. The joints with the case are of course outside of the slits in the cylinder walls, and farther inward the cylinders are aligned by means of the before-mentioned projections or teeth upon the metal of the casing. The exhaust valve is 50 millimeters in diameter, its stem 14 millimeters. The valve springs are of 3-millimeter steel wire bent to hairpin form and coiled with 2 1/2 turns. The maximum stroke of the exhaust valves is 10 millimeters and the minimum 3 millimeters. The valve seats, screwthreaded, and the valve guides, formed as simple two-armed yokes, are made very strong and in one piece with the fulcrum piece for the rocker arms. Bearings and lubrication are as in earlier models. The *monosoupape* is made in two sizes, one with 7 cylinders of 110 millimeter bore and 150 millimeter stroke giving 80 horsepowers at 1,200 revolutions per minute, and another with 9 cylinders of the same dimensions giving 100 horsepowers.—From *Der Motorwagen*, July 20.

Recent Court Decisions—Owner Held Liable

By George F. Kaiser

RESPONSIBILITY of a motorist for damages caused to his car depends on whether or not the driver was or was not engaged in his business at the time of the accident, says the Court.

A collision occurred between two automobiles, one of which was driven by a 19-year-old daughter of the owner. She usually drove the car, but at the time of the accident had turned the wheel over to a cousin at whose house she had been calling in company with her younger sister. The Court said it was a question whether or not she was engaged on her father's business at the time of the accident and answered the question affirmatively, saying that when a parent has an automobile and a child is authorized to use it at any time and the child injures a person, it is error to say that as a matter of law the parent is not liable. The Court also said that the fact that an agent when driving a car on his master's business permits a stranger to drive it, the master is not thereby relieved from liability.—*Kayser vs. Van Nest*, 146 N. W., 1091.

Texas Repair Man's Lien

Texas Court holds automobile repair man has a lien for storage and repairs.

A car owner placed his car with a motor company for repairs, with the understanding that it was to be put in first class condition. A dispute arose as regards the bill and the owner, refusing to pay, the dealer advertised the car for sale. The owner then sued them for \$1,000 damages to the car, \$385 for loss of use of the same and asked that an injunction be granted restraining the sale. The owner claimed that it was agreed that \$35 was to be paid by him to cover all charges for labor and materials. The defendant denied this agreement and claimed \$73.17 was the reasonable value of the work and also asked payment at the rate of \$5 per month for the period during which the owner refused to accept the car and pay the bill.

The repair man recovered judgment for the charges and for storage at the rate of \$2.50 per month, the Court saying: "At common law warehousemen had a special lien on property stored with them for their proper charge in connection with the specific bailment and the right to retain possession until paid, and such lien and right were preserved by the revised Statutes of 1911, Act 5671, providing that nothing in Chap. 8 relating to liens of which such article is a part should impair or effect liens arising at common law or in equity and

hence a company engaged in the business of repairing and storing automobiles is entitled both at common law and in equity to liens on a car for storage charges after the owner improperly refuses to pay for the repair and remove the car.—*Macolm vs. Sims Thompson Motor Car Co.*, 164 S. W. (Tex.) 924.

Suit of Newsboy's Father Reversed

Court holds that where a father sues a motorist to recover for money he has spent for hospital services, and to hire a physician to attend his son, who was run down and injured by an automobile, he is entitled only to recover the reasonable value.

A newsboy was run down and injured by an automobile. His father sued, as guardian, and recovered \$750 for his injuries. He then started another action against the automobile owner, claiming \$5,500; \$5,000 for loss of services to the father, and \$500 for expenses. The jury gave him a verdict for \$500. When the motorist appealed, the case was reversed, because the court held that it was wrong to put in evidence all that the son earned as a newsboy, when part of his earnings consisted of tips, as tips were too indefinite to be properly computed.—*Forgeson vs. Hanford*, 139 Pac.

Motorist Not Liable

California Court says that it is the duty of foot pedestrians to look both ways before starting to cross a street, particularly when the street over which the pedestrian intends to cross is a busy thoroughfare in the heart of the business district of a great city and that the fact that a motorist violates a speed ordinance does not prevent the Court from finding the pedestrian guilty of contributory negligence and refusing to allow him to recover for his injuries.

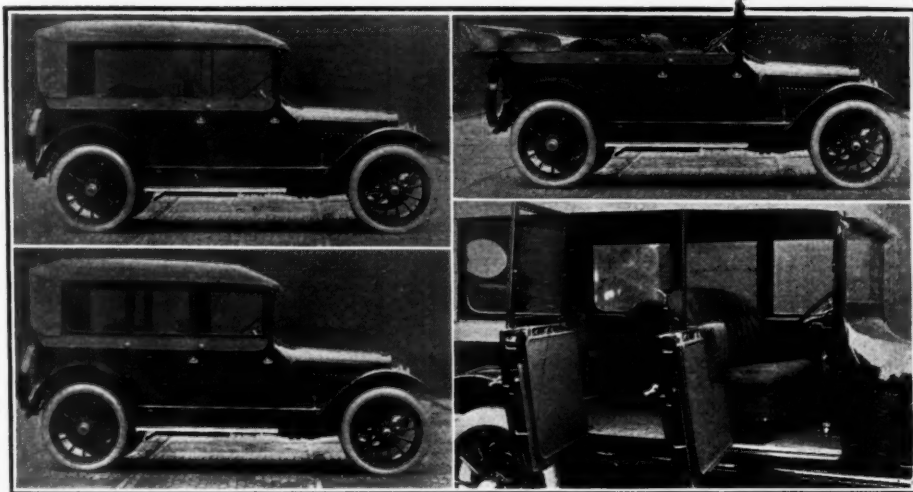
This case was a suit for personal injuries caused by an automobile in Oakland, Cal. The chauffeur was found to have been guilty of negligence because he drove his car at a speed in excess of that allowed by the city ordinance and gave no warning on approaching the street crossing. The injured person sued both the chauffeur and the company by which he was employed. It was found that the chauffeur was not on the company's business, however, so he was held not to be liable and then the Court further finding that the pedestrian was guilty of contributory negligence absolved the company from liability and rendered judgment against the injured person.—*Davis vs. John Breuner Co. et al.*, 140 Pac. (California) 386.

Wide Doors in New Convertible Bodies

Springfield Company
Has Three New Bodies—
Sedan, Limousine and
Runabout Types

THREE new convertible bodies with exceptionally wide window spaces have recently been added by the Springfield Metal Body Co., Springfield, Mass. In the limousine and sedan types the window space has been divided into three panels, giving a better lookout and, since the doors are wider, easier entrance and egress. In addition a convertible runabout type, also with wide doors, is offered.

The new limousine is built with five and seven-passenger bodies and differs from former models in that the doors have been widened considerably, the front one now being 22 inches and the rear 27; in this way the window between the two doors in the older models has been eliminated. This change not only gives the passengers more room but it simplifies the raising or lowering of the sides. The door windows are on hinges and lay on the inside panel of the doors. They are covered by a pad of the same material as the upholstery, and in raising the sides it is merely necessary to swing these pads out of the way and pull up the windows. Only the rear windows are carried



Four views of new Springfield limousine type. Note three windows, instead of four

in a pocket on the back of the driver's seat, while in the old type the windows between the doors are also carried here. Thus it is seen that it is less trouble to put up the sides on this new body.

The sedan type is similar to the limousine except that it has a single door 25 inches wide. There is an aisle between the front seats which are of the chair type. This model is designed with seating capacity for four or five people.

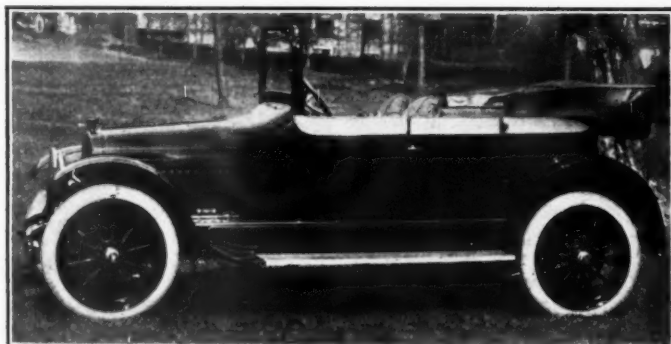
The runabout is made with either a two or three-passenger body.

The painting and the upholstery as well as details concerning the interior fittings are left to the individual taste of the purchaser. The upholstery material may be hand-buffed leather, broadcloth or motocloth.

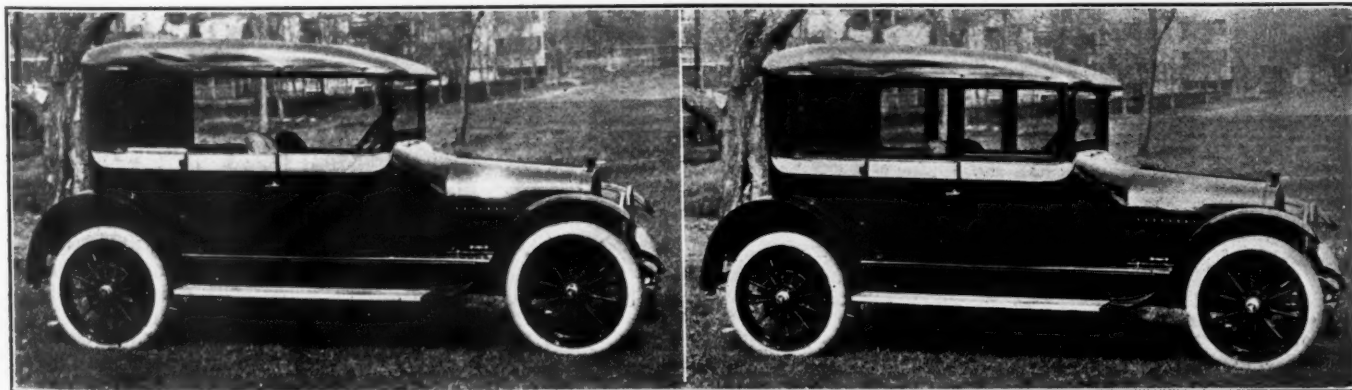
The prices of the bodies mounted are: Runabout, \$900; sedan, \$900; five-passenger limousine, \$1,300; seven-passenger limousine, \$1,400.

The advantages of the convertible type of body are almost too well known to require enumeration. It does the work of two bodies, one of the closed and another of the open type, and further has the advantage of being able to change from one to the other in less than 5 minutes. In changeable weather this is of special advantage because one day it may be pleasant enough for the touring type of body while the following day it may be cold and inclement enough to make the closed type highly desirable.

These bodies may be mounted on any standard chassis.



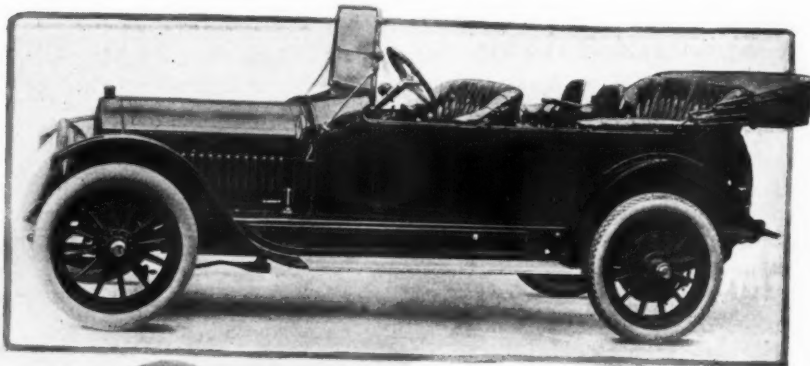
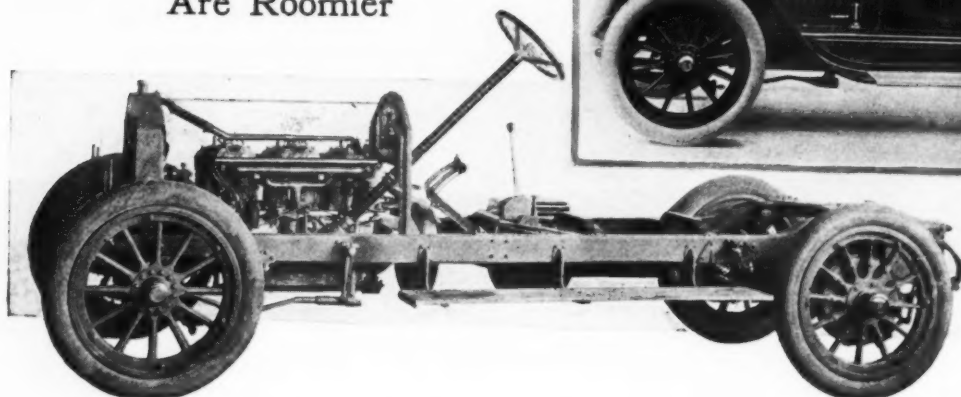
Sedan with top and sides down



Left—Sedan with top raised. Right—Sedan fully inclosed

1915 Republic Is 2 Inches Lower

Clutch Has Springs Under
Facing—Steel
Timing Gears Used—Bodies
Are Roomier



Above—1915 Republic six-cylinder, seven-passenger touring car for \$2,950. Note new method of fastening windshield

Left—Side elevation of six-cylinder chassis on which two, four and five-passenger bodies are mounted

MARKED body changes, a reconstructed clutch, steel timing gears and the introduction of the Stewart-Warner vacuum gravity gasoline feed are the changes in the Republic Six for 1915. The cowl has been lowered and lengthened, the distance between the dash and front seats increased 2 inches, the seats lowered 2 inches and the method of fastening the windshield has been improved, giving a longer, lower car than the preceding model. The price of the car remains the same at \$2,950 for the two, four- and five-passenger bodies.

T-Head Six-Cylinder Motor

The chassis which carries all the body models made by the Republic Motor Car Co., of Hamilton, O., has a wheelbase of 133 inches. The power plant, which remains the same as in the 1914 model, is a six-cylinder 4.25 by 5-inch motor, rated by the manufacturer at 60 horsepower and having a formula rating of 43.5. It is of T-head design with the cylinders cast in pairs.

The cylinders are cast of close-grained gray iron and carry 2.25-inch interchangeable exhaust and intake valves. The pistons are of good proportions, measuring 5.5 inches in

length. The connecting-rods are of I-beam section and are 11 inches in length. The crankshaft is carried on four main bearings, the front and center ones are 2.5 inches long and the rear which carries the strains imparted by the starting motor, which engages with the flywheel, is 3.5 inches long, providing a good margin of strength at this point. The crankshaft diameter is 2 inches.

Two Camshafts Employed

There are two camshafts, each with the cams cut integrally on the shaft. The camshaft bearings are four in number and the diameter of the camshafts is 1.5-1.6 inch. The two center camshaft bearings and the rear bearing are 2 inches in length. The forward camshaft bearing which receives the thrust given by the timing gear in driving the shaft is made 2.75 inches in length. This year the timing gears are made of steel whereas in the 1914 model the gears were of cast iron.

Force-Feed Lubrication

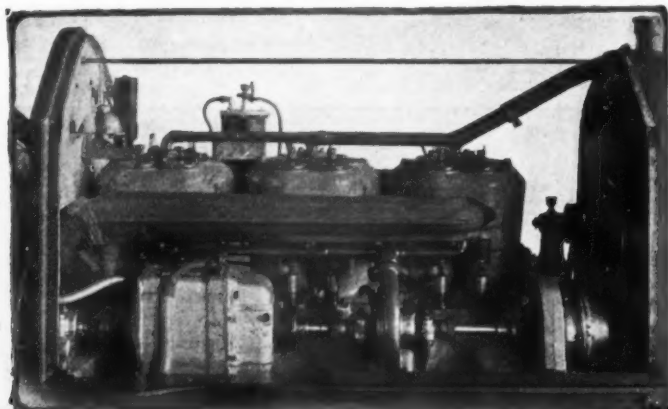
The motor is oiled by a force-feed system. The oil is carried in a reservoir beneath the crankcase and is pumped from this by a gear pump which takes the oil through a sight feed on the dash and then forces it through an independent lead to each of the main bearings and by means of a hollow crankshaft to the lower connecting-rod bearings. From the latter point the oil is thrown to the cylinder walls.

Delco Lighting, Starting and Ignition

The electric equipment of the car consists in a Delco lighting, starting and ignition plant. The Delco system installed on this car has one special feature which distinguishes it from other Delco designs in that the starting drive and the generator drive are independent. The control is also the latest design, starting being accomplished by merely depressing a pedal. The Delco ignition system is a dual design. The running current is supplied by the generator and the battery supply for starting from the storage battery.

Stewart Gravity Feed System

The gasoline system is the Stewart-Warner vacuum gravity system. A 21-gallon gasoline tank is supported from the



Right side of six-cylinder motor 4.25 by 5 inches, used in the 1915 Republic. The manufacturer rates this motor at 60 horsepower. Its formula rating is 43.5. Note mounting to Delco generator on pump shaft

rear of the frame members. The system comprises a float tank attached to the dash of the car and two pipes, one of which runs from this tank to the carburetor and the other to the fuel tank. The suction of the motor draws the fuel first into the small dash tank from which it flows by gravity to the carburetor. It is claimed that this system does away with the disadvantages of a pressure feed and is still simple. A Rayfield carburetor is used.

The cooling of the motor is effected by a gear-driven centrifugal pump which forces the water through a cellular radiator and through the cylinder water jackets.

Springs Under Clutch Facing

The clutch which has been rebuilt this year is still of the cone type but instead of having cork inserts there are a series of flat springs placed beneath the leather. The springs are twelve in number equally spaced about the periphery of the cone. The operating mechanism of the clutch has not been altered. The pedal for the clutch also operates the service brake. Another pedal operates the emergency brake, thus permitting the operator to put on both sets of brakes and at the same time to keep both hands on the steering wheel. The gearset is the same as in the past, furnishing four forward speeds. The gears and shafts are of 3.5 per cent. nickel steel operating on Hess-Bright ball bearings.

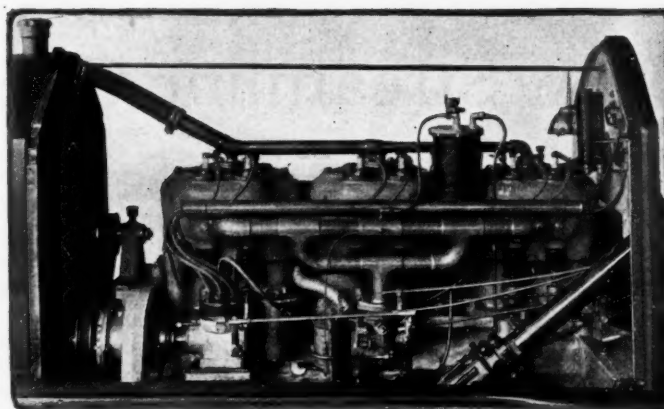
Hess-Bright Bearings Used

The driveshaft operates the bevel gear differential through a 3.5 per cent. nickel steel pinion. The axle is a floating design inclosed in a pressed steel housing and runs on Hess-Bright annular bearings. The shafts are vanadium steel and the gears are chrome vanadium. The front axle is a drop-forged I-beam and the running parts are carried on Hess-Bright ball bearings.

The chassis frame is of pressed steel channel, 5 inches in depth, and made up of 3-16 inch material with integral gusset plates to meet the strains of the rear spring suspension. It is narrowed at the front end to shorten the turning radius and has a dropped construction over the rear axle.

Left Drive and Center Control

The tread of the car is standard, and the wheels are 36 inches in diameter, taking 4.5-inch tires. The front springs are chrome vanadium, 2 by 38 inches. The rear springs are three-quarter elliptical 2.25 inches wide and 50 inches long. They are fitted with rebound straps. The brakes operate on drums bolted to the rear wheels and are 2.5 inches wide by 16 inches diameter. Left drive and center control is used. The steering wheel is 18 inches diameter.



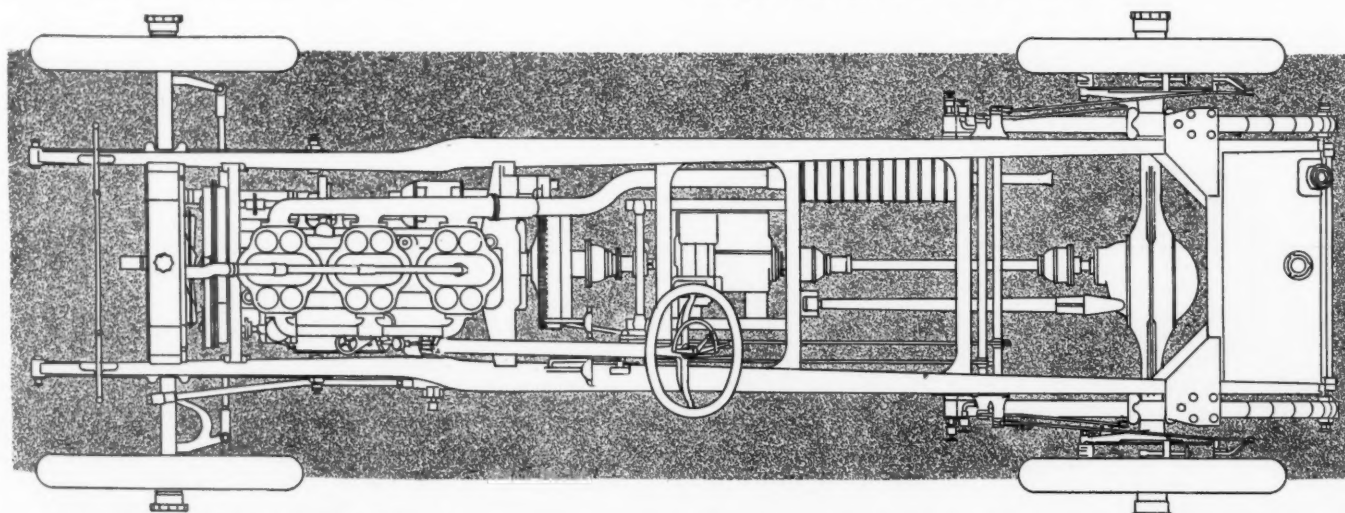
Left side of six-cylinder motor used in 1915 Republic, showing mounting of Rayfield carburetor, intake manifold and hot air intake for carburetor brought between front pairs of cylinders. Also note mounting of Delco ignition system. This is a dual design, the running current being supplied by the generator and the battery supply for starting being taken from the storage battery

New Company To Build Light Car for \$800

PONTIAC, MICH., Ju'y 31—Men well known in the automobile trade all formerly connected with the Oakland Motor Car Co., are now organizing a new company which is to have a capital of not less than \$300,000 and which is to build a light, popular-priced automobile, which it is said will cost between \$800 and \$900. The promoters are, former vice-president George E. Daniels; former assistant sales manager Howard Bauer; J. H. Newmark, former advertising manager; W. R. Williams and L. Eccleston. The concern will probably locate in Pontiac although this has not been definitely decided.

\$825,394 in Packard Truck Sales in 4 Months

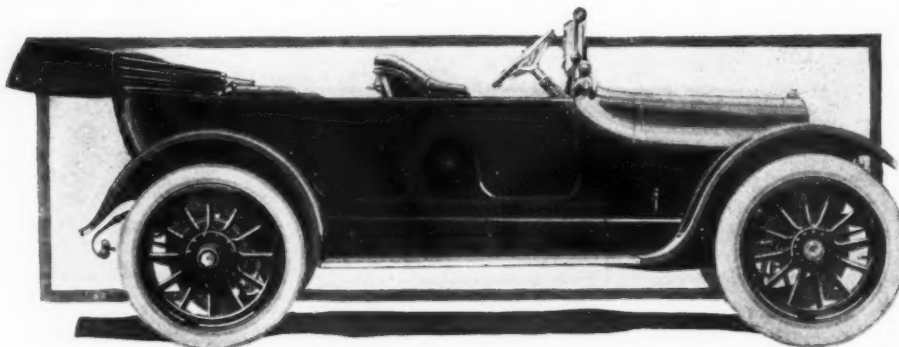
DETROIT, MICH., July 31—During the 4 months from March to June, 1914, the motor-truck business of the Packard Motor Car Co., Detroit, has been near 60 per cent. greater than during the corresponding period in 1913. During June the number of trucks sold represent a sum of \$825,394, or \$256,994 more than in June, 1913. "If the business continues that way," said one of the officials of the Packard company, "and we see no reason why there should be a slacking down, it will probably mean the biggest business year the Packard company has had in the sale of its trucks."



Plan view of Republic chassis, showing main gasoline tank at the rear from which fuel is led to the float tank attached to the dash of the car, whence it runs to the carburetor and motor by gravity. Note strong torsion rod from differential housing to cross-brace at rear of gearbox

New Streamline Overland Has Left Drive

Four Cylinder Chassis
Continued
Practically Unchanged—
Reciprocating
Parts Lighter—
Many
Minor Refinements



Overland four cylinder, five-passenger touring car for 1915. Note the streamline body with left drive. This car uses 34 by 4-inch tires and sells for \$1,075

UNDER the name of Model 80, the 1915 Overland four-cylinder car is a continuation of the Model 79 introduced for 1914. The new car remains the same in all the elementary features and important dimensions as in 1914, but has been refined throughout to give a larger, roomier design of up-to-date appearance.

Graceful Streamline Body

The striking feature of the new model is the large, graceful streamline body with its left drive. This is the first year that the steering wheel has been mounted on the left in Overland cars. In shifting from right to left drive little change has been made in the chassis. In fact, the only alteration necessitated in the motor is the bending of the exhaust manifold closer to the cylinders.

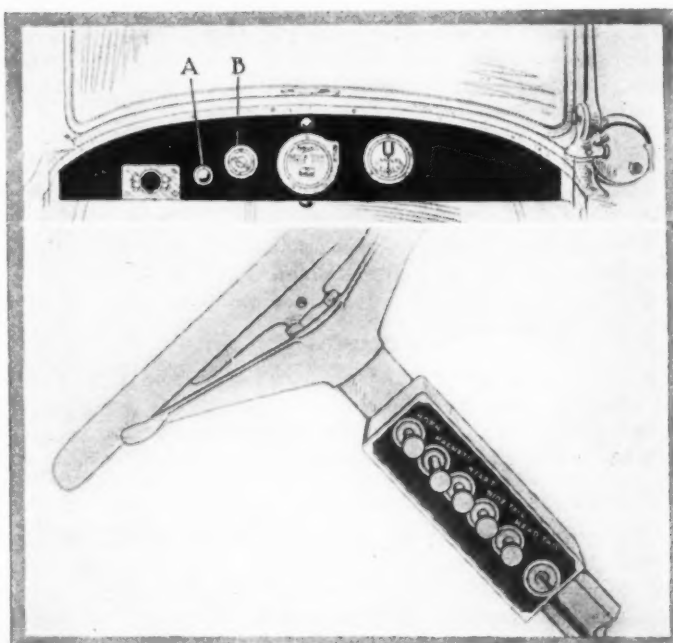
Improvement in Oiling System

The chassis remains practically the same as it was on the Model 79. The motor has not been altered, with the exception of a small improvement in the oiling system, which has been made to insure all cylinders securing an equal amount of oil on level roads and when ascending a steep grade. The change provided to accomplish this result is the moving of the oil feed to the forward end of the crankcase. The reciprocating parts have been lightened by making the webs in the pistons thinner than last year, and the piston rings are now balanced by having drilled holes which allow the gases to get behind the rings.

For easier assembly and to do away with metallic sounds, a union joint has been placed in the exhaust pipe just back of the motor. Ignition is now by Bosch high-tension magneto driven at crankshaft speed through a leather coupling. The carburetor is also improved by having a hot-air attachment for both the primary and auxiliary ports.

New Features of Control

In moving the steering gear to the left, the gear control is set farther forward from the front seat than it was in the previous model. Other features of the control have also been changed: A switch box is now attached to the right side of the steering column, 2 inches below the wheel. Through this keyboard the electric horn, lights and ignition are controlled without the effort of stooping forward to the instrument board. The starter button is also on this keyboard and must be pressed before the starter pedal. This arrangement has been made so that it is not possible for the driver to throw in the starter by accidentally stepping on the starting button. Pressing a button on the steering column operates a solenoid which unlocks the sliding gear. The current is



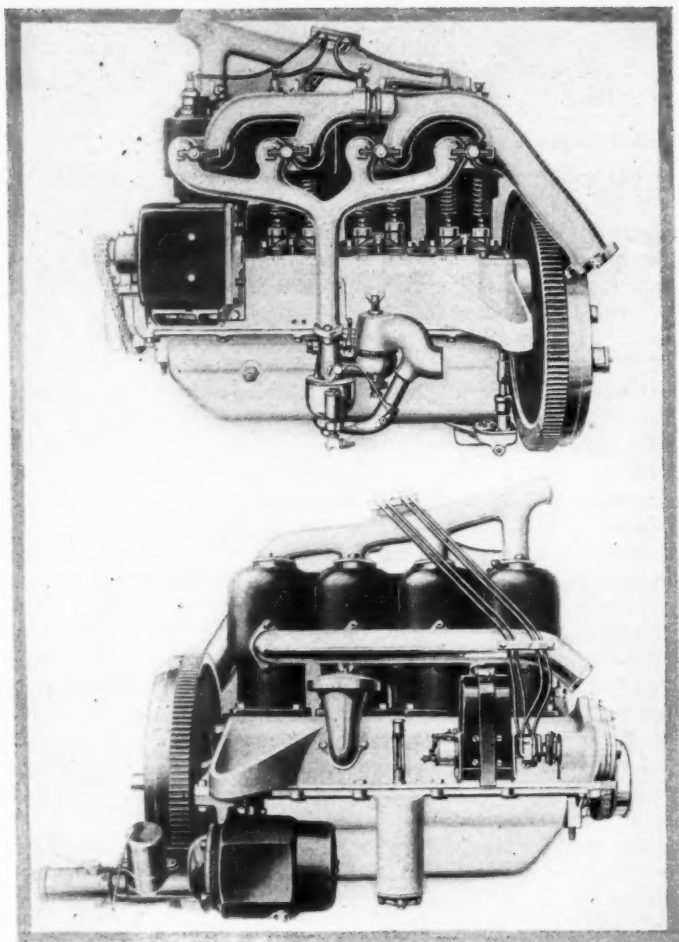
Above—Cowl board of 1915 Overland. A is the primer and B is the sight feed for the oil in which a small vertical wheel operated by the oil always shows how the oil is flowing when the motor is running. Below—Control switches mounted on steering column, forming a centralization of electrical control

connected when the armature shaft sliding gear meshes with the teeth of the flywheel gear.

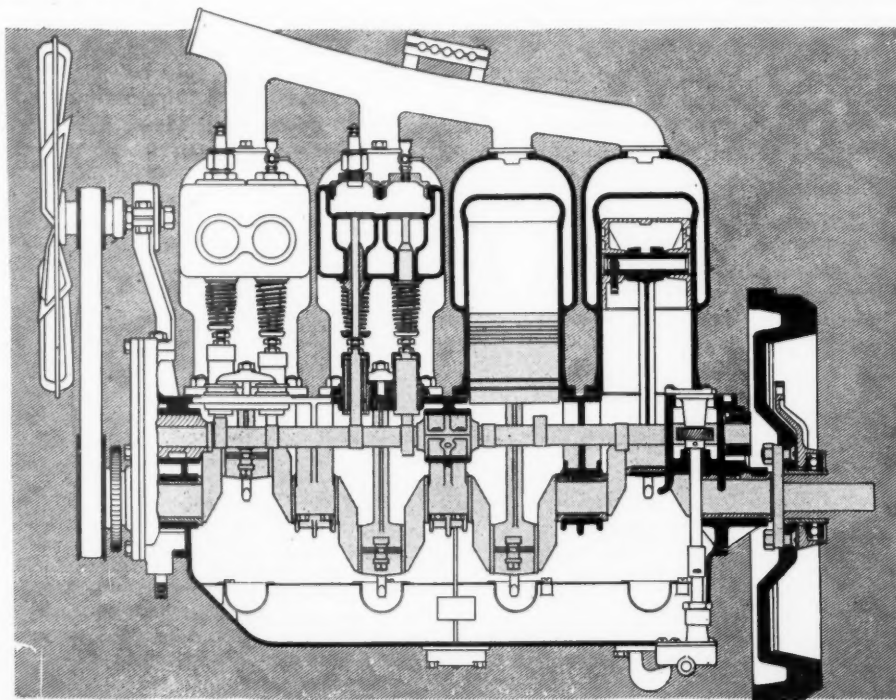
There is a muffler cut-out on this model which can be operated by kicking a small lever. The accelerator is of new design and a side rest is provided for the foot to eliminate strain when driving for a long distance. The pedals on the coupé model are now adjustable. A new sight feed will be found in the layout of dash instruments. This is an ingenious device which has a small vertical wheel operated by the oil passing through the sight feed. When the oil clogs the feed so that the ordinary sight feed would not be visible, with this device it is still possible to see the revolving wheel and thereby follow the oil flow.

Body Has Been Greatly Enlarged

The body has been greatly enlarged and provides an exceptional amount of space both in the forward compartment and in the tonneau. Though the wheelbase remains at 114 inches, the space has been utilized better and larger seats and many other features of comfort included. The rear seat,



Above—Valve side of Overland four-cylinder motor for 1915. Note the unusually low mounting of new Schebler carburetor insuring proper feeding of fuel under all conditions. Lower—Exhaust side of 1915 Overland motor showing high-tension Bosch magneto driven through a flexible leather coupling, oil level indicator and location of starting motor. Note large water intake pipes for thermo-siphon cooling system, and also method of conducting wires from magneto to plugs.



Part sectional view of 1915 Overland motor showing mounting of spark plugs directly over intake valves and priming cups directly over exhaust valves

for instance, is now 49 inches wide inside. The front seat is 40 inches wide, and the backs are 19.5 inches high in the rear and 17 inches in the front. The seats are 20 inches deep in the rear and 19 inches in front.

Curtains Stored in Front Seat Back

Many interior refinements are to be noted. There is a new top which has its storm curtains stored in a metal box directly behind the front seat, rendering it possible to put these curtains up without disturbing the passengers in the tonneau. Instead of the leather straps which ordinarily hold the folded-down top, the new Overland has a unique clamp which holds the top back securely and at the same time prevents all rattling. Leather pockets are now provided in all the doors and in addition these doors are hung on concealed hinges with inside-operated latches placed so as to make it impossible to catch in the clothes of a passenger leaving the car.

The front seat has a division between the driver and the front passenger, whereas in the Model 79 the front seat was all in one. The windshield is now built directly on the top of the cowl and provides rain vision and ventilating facilities, at the same time being waterproof. The fittings on this windshield are smaller than on the previous design. The folding windshield brackets are now vertical in place of the sloping brackets used before. These changes are in line with the development of the streamline form of car used this season. The radiator is molded into the body curve and the engine hood slopes gradually to the new form of cowl dash. The body line then sweeps without abruptness to the full curved tonneau back, giving a well-rounded design, which follows the modern trend in body design without offering anything of a radical departure from standard practice.

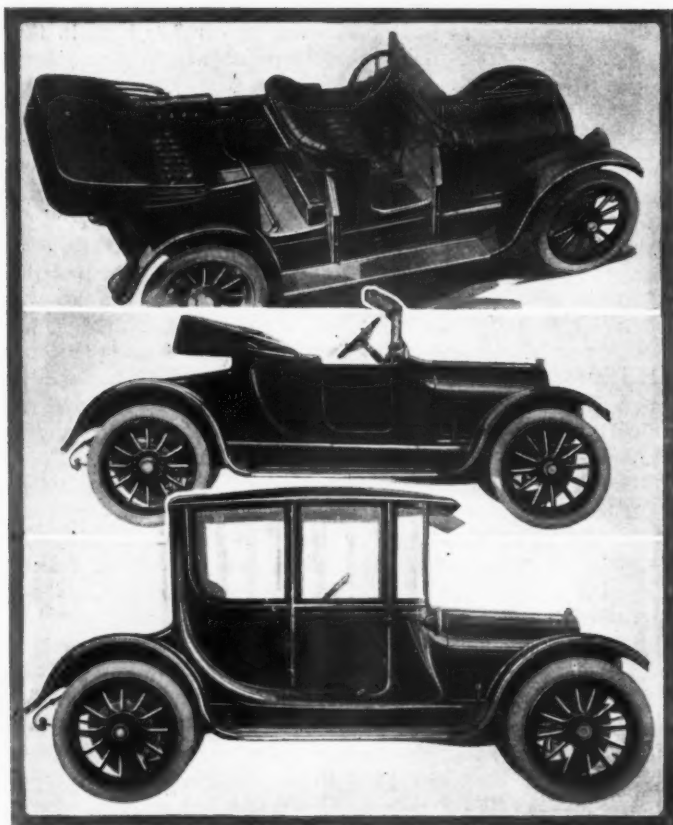
Body Is 3.25 Inches Lower

The floating axle is continued and the brakes are unchanged, but a new design of front axle is employed, which, together with the body frame, brings the body 3.25 inches closer to the ground. The rear springs are now underslung and both front and rear are the same shape as in the Model 79. The rear springs are longer than they were, being now 48 by 2 inches whereas they were formerly 42 by 1.75 inches. On the Model 80 the frame has been given a drop of 3.25 inches. It is much stronger, having a channel section 3-16 inch deeper, 1-4 inch wider and 1-64 inches thinner in the web than the previous model. The wheel size of the car has also been increased and now 34 by 4-inch tires are used in place of the 33 by 4.

Electrical System Slightly Changed

The starting and lighting system has been re-designed in many particulars: while in the previous model the starter shaft was connected with the crankshaft by silent chain, it now meshes directly with a gear wheel on the flywheel. With the new starting system the Overland engineers claim that the motor can be cranked under ordinary circumstances at from 190 to 200 revolutions per minute. The electric generator, which is a separate unit, is mounted on the left side of the motor and is driven by silent chain. The features of this system will be described later.

The price of the standard touring car model, seating five passengers, is \$1,075. The two-passenger roadster



Top—Body view of 1915 Overland five-passenger touring car, showing arrangement of instruments on cowl board, centralizing control on steering column, left drive, hand control quadrant set forward for easy egress, pockets in doors and container for side curtains behind front seat. Middle—Two-passenger roadster design fitted on four-cylinder chassis. Bottom—Four-passenger coupé

is offered at \$1,050, while the four-passenger coupé, which comes equipped with 35 by 4.5 non-skid tires, is listed at \$1,600. These prices include full equipment, and are the same for the touring car, \$25 less for the roadster and \$50 more for the coupé than they were for the previous model.

Motor Develops 35 Horsepower

The Overland power plant has its four cylinders cast singly and set 9-16 inch off center. The cylinders are L head shape, carrying the valves and manifold all on the left side of the motor. The bore is 4.125 and the stroke 4.5 inches, developing, according to the Overland engineers, 35 horsepower on the brake at normal speed. The pistons have two rings, each of which is a double design providing compression and lightness in small space. There are two oil grooves below the wristpin. The wristpin is held solidly in the piston boss and is of hollow design. The wristpin bearing is lined with bronze. The connecting-rods are I-beam section and are connected to the crankshaft at the crank bearing by two bolts.

Five-Bearing Crankshaft

The crankshaft is a carbon steel drop forging having five main bearings. The length of the main bearings are respectively 3.5 inches and 2.125 inches. The rear bearing has the first mentioned length, having to carry the flywheel and to take the thrust of the starting motor. The other four bearings are all the same length.

The camshaft is also a carbon steel drop forging and is carried on three bearings. The length of the rear end bearing is 2 inches, the front bearing is 2.25 inches and the center bearing 2.75 inches. The diameter of the camshaft is .9375 inch. The cams are integral with the camshaft and act directly on the push-rods of the valves.

The tappets are held in long guides which are designed to

prevent oil from leaking past the bushings. The valve springs are held in cup-shaped disks and the valves are also provided with bushings at the point where they enter the cylinder.

Spark Plugs Over Intake Valves

The spark plugs are placed directly over the intake valves and priming cups are placed over the exhaust valves. The shape of the ports and the method of extending the water jackets around them are shown in the sectional view of the motor. Valve opening diameter 1.625 inches, intake lift 11-32, exhaust 13-32 inches.

Cooling By Thermo-Syphon

Cooling is accomplished by a thermo-syphon system and the water jackets, together with the water intakes and outlets, have been kept large with a minimum amount of curvature to meet the requirements of this system. Cooling is further aided by a six-blade fan driven by a belt. The fan bracket is bolted to the crankcase. A change has been made here for this season in that the fan now runs on ball bearings in place of the plain bearings used in Model 79.

Lubrication of the motor is secured by the constant level splash system, in which the oil is circulated by a pump. The oil reservoir is in the bottom half of the crankcase and from this point the oil is taken by a gear pump and forced through the new sight feed on the dash. The oil lead runs along the length of the crankcase and keeps the splash troughs constantly full. The scoops on the bottoms of the connecting-rods keep the bottom of the motor filled with a thick oil mist.

Current for ignition is supplied by the Bosch magneto mounted on a bracket at the right front end of the motor. The drive is through a leather coupling and the leads are carried in fiber blocks which are held on the water intake and outlet pipes.

Bosch Single Ignition Used

At the speed at which the motor cranks the engine, there is no need of an auxiliary system for starting and hence the Bosch single ignition has been adopted. The generator which supplies the current for the storage battery is mounted on the left side of the motor at the front end and is driven by silent chain off the crankshaft. The generator cuts in at a car speed of 7 miles an hour and reaches its maximum output of 14 amperes at 18 miles per hour. Regulation of the current is effected by a compound shunt winding in the armature of the generator. The cranking motor is series wound, operating at 6 volts through a gear which meshes directly with the flywheel.

Double Heating of Carbureter Intake

The gasoline system is by gravity. On the touring cars the capacity of the tanks is 15 gallons and on the roadster 30 gallons. The carbureter is the latest design of Schebler Model R, provided with a double heated air intake which takes care of both the primary and auxiliary air supplies. This arrangement is shown in the side view of the motor. The carbureter primer has been moved from the steering column to the cowl board and by its use a rich mixture can be provided for starting. No amount of gradient which will ordinarily be found can affect the flow of gasoline to the carbureter, as it is hung exceptionally low. The straight part of the intake manifold extends vertically upward to some distance before it branches out in the balanced Y in passing to the cylinder ports.

New Gear Ratios Adopted

The clutch is a leather-faced cone provided with a brake to aid in gear shifting. This design has not been changed in any particular. The gearbox, while the same in nearly

every particular, now has a different set of gear ratios and the countershaft has been made adjustable by the addition of two adjustment screws, one at either end. The gear ratios are now as follows: First—11 7-16 to 1; second—6 7-8 to 1; third—3 3-4 to 1; reverse—14 3-4 to 1.

With these ratios at 1,000 revolutions per minute of the motor, the car would be traveling 8.85 miles per hour on first speed; 14.65 miles per hour on second speed; 27.0 miles per hour on third speed and on reverse 6.86 miles per hour.

Rear Axle Gearbox Continued

As in the past, the Overland gearbox is mounted at the rear and bolts by means of a broad flange against the housing of the rear axle. The propeller shaft, which is of cold rolled steel, high forging stock, is 1.125 inches in diameter and is inclosed in a torque tube which is flanged at its rear end and is there connected to the gearbox, while at its forward end it terminates in a forked yoke which is connected flexibly to a cross member of the frame, thus permitting a rising and falling action of the rear axle. There is only one universal in the driving line and this is located at the front end of the driveshaft.

Three-Quarter Floating Rear Axle

The floating rear axle is carried on Hyatt roller bearings. In this, the outer bearing is mounted on the outside of the axle housing. By this arrangement the shaft does not carry the weight of the car but merely transmits the driving stresses. There is a thrust bearing on the axle shaft at its inner end, which takes up any side thrust.

Longer Springs Are Used

Longer springs are now used to accommodate the larger body. The brakes are the same as on the Model 79, having a drum diameter of 13 inches inside. The front axle is new. It is a drop forged I-beam. The steering knuckle spindle is equipped with Timken taper roller bearings. While the steering gear has been moved over to the left side, it has not been changed in any other particular. It is an adjustable worm and full gear type with the housing bolted to the side frame. The steering wheel diameter is 18 inches and on this the spark and throttle levers are mounted as usual.

Touring, Roadster and Coupé Bodies

In body work the Overland car for 1915 provides either a five-passenger touring body or a two-passenger roadster. There is also the four-passenger coupé. The body is a



Interior view of Overland coupé. The entire interior is finished in Bedford cloth. Levers operate the windows, foot pedals are adjustable and all passengers face forward. This car sells for \$1,600

streamline design and the frame, running-board brackets and battery box are concealed by mud shields, which add materially to the appearance of the car by giving it a long, low appearance. The swivel seat used in the coupé may be faced either forward or backward.

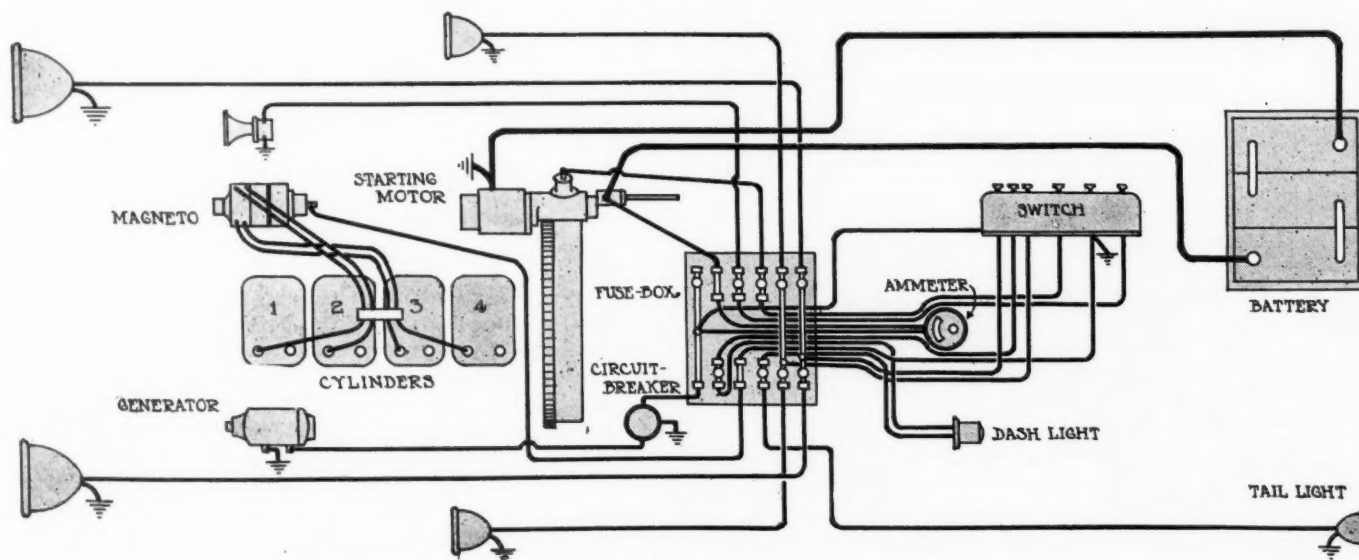
Tires are carried at the rear on all models.

All cars come fully equipped with starting and lighting systems and carry side lamps, being one of the few 1915 designs which provide lamps in this position. The fenders are crowned and the latest ideas in top and upholstery work have been incorporated.

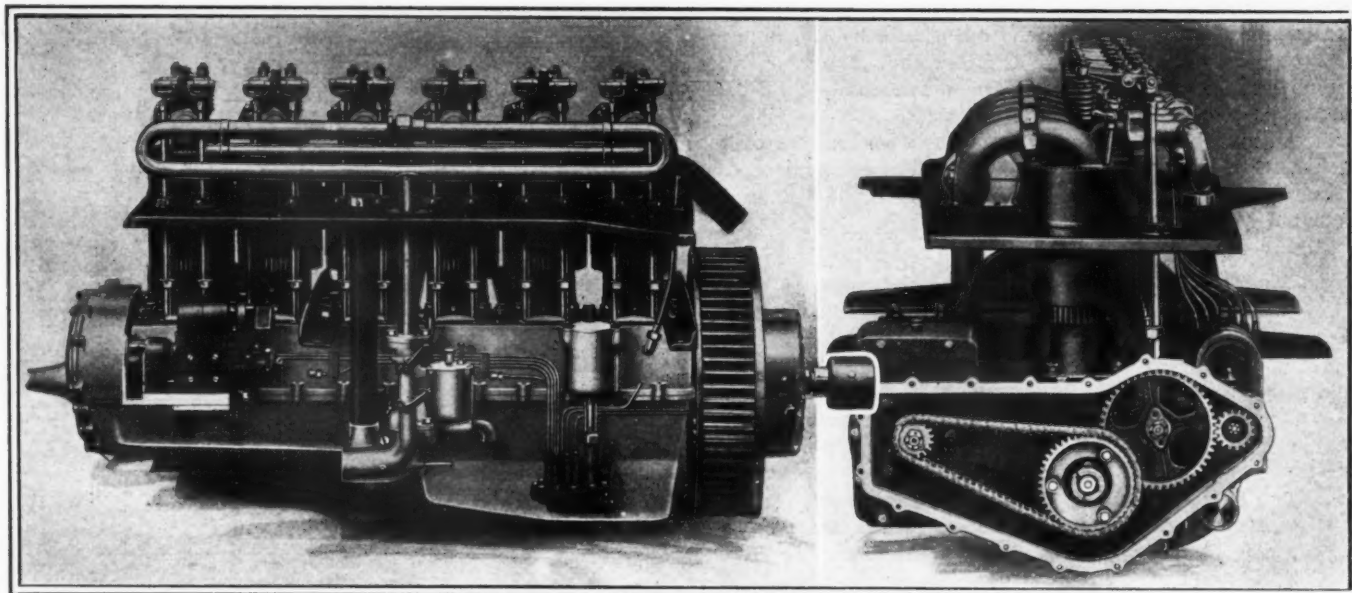
Chile Has Active Automobile Clubs

SANTIAGO DE CHILE, July 1—The Automobile Club of Chile has been organized with a membership of more than 135. The objects of the club are to establish clubhouses with all facilities for the members of the club, to report highway conditions and to study the possibilities of obtaining lower prices for imported fuel, tires and other necessities.

Another active Chilean Automobile Club is that of Valparaiso which is composed of some thirty members, all interested in the increase of the automobile industry.



Wiring diagram of the electric system used on the 1915 four-cylinder Overland



Side view of the motor showing redesigned intake and a front view with the gear cover removed

Franklin Uses Skew Bevel Drive

Many Detailed Body Refinements and Better Equipment—Prices \$150 Lower on Series Six

IN bringing out the Series Six car which followed the Series Five without a break in production, the most important change that the Franklin company has made has been the reduction of \$150 on the price of the touring cars and roadsters, while on the closed cars a still greater reduction has been made. The reason assigned for the reduction is that the factory has been able to reduce its costs by the concentration on one model, an occurrence of a year ago. By this concentration the use of special machinery and improved factory methods has practically doubled the factory output without increasing the building area.

The body lines of the Franklin are now more graceful than previous models. The body is larger, the seat sides higher and the upholstery finished off more luxuriously than ever before. The sloping hood has been continued, but has been given a more gradual slope, and this in connection with the use of a shutter effect on the front of the hood instead

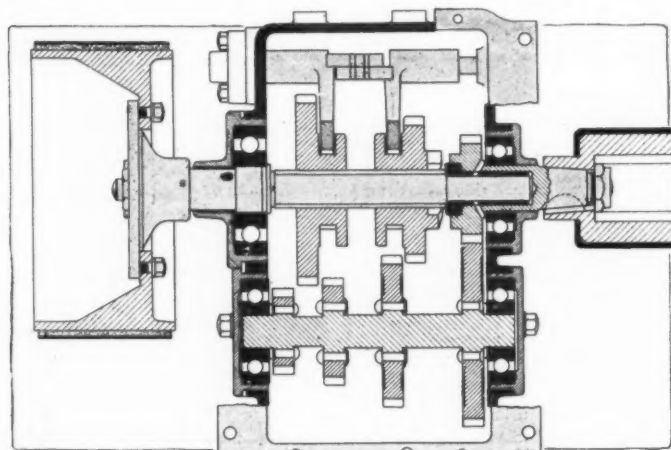
of the old-type grill has given a more sturdy and powerful appearance.

In the motor only one slight change will be found and that is the fitting of the oil adjustment on the cowl board. The starter is lighter and more accessible than before, and, while it is still the Dyneto system, it has been improved so that it is now 40 pounds lighter than the model used last year. Both the commutator and brushes have been improved.

The only other change of importance on the chassis itself is in the rear axle. Now skew bevel gears are used, whereas previously the straight bevel type was employed. These gears are made by the Brown & Sharpe Mfg. Co., and had been adopted with a view to obtaining silent action. A number of little detail points such as the wing pivot bolts, front springs, magneto attachment, etc., have been improved. For instance, the magneto is now attached by means of two dowel pins and a divided metal strap over the top in place of the bolted-on brackets used last year. In the front springs the deflection was 1 inch to 180 pounds. It is now 1 inch to 200 pounds. No change whatever has been made in the rear springs. In the spring pivot bolts a new bushing has been employed which incorporates a felt washer intended to keep the dirt out and the oil in.

Cord Tires Standard Equipment

Better equipment will be found throughout the car. Most noticeable is the employment of either the Goodrich Silver-town cord or the Goodyear Power Saver tires as regular equipment. This is in line with the move made by makers of the highest priced cars for this season. Another provision this year which is an innovation for the Franklin company is the fitting of a power tire pump. This is a Hartford single-cylinder design and the pump itself, together with the bracket supporting it and the clutch for engaging it to the motor drive, only weighs 6.5 pounds. By the use of this power pump the Franklin company claims to have removed the only excuse for the heavier demountable rim



Sectional view of the gearbox showing shifter mechanism and bearing

in place of the Q.D. type which they employ. This light rim equipment is in line with the work throughout the car where everything has been done to make it as low in weight as possible. On the series six the Golde one-man top with curtains that can be operated from the inside will be found. On this top the side curtains fasten to the windshield, making a weather-tight joint. In adopting this top a new style of windshield had to be fitted and this is now the double-glass, rain vision, either half of which can be adjusted in any position.

Improvements in the Body Work

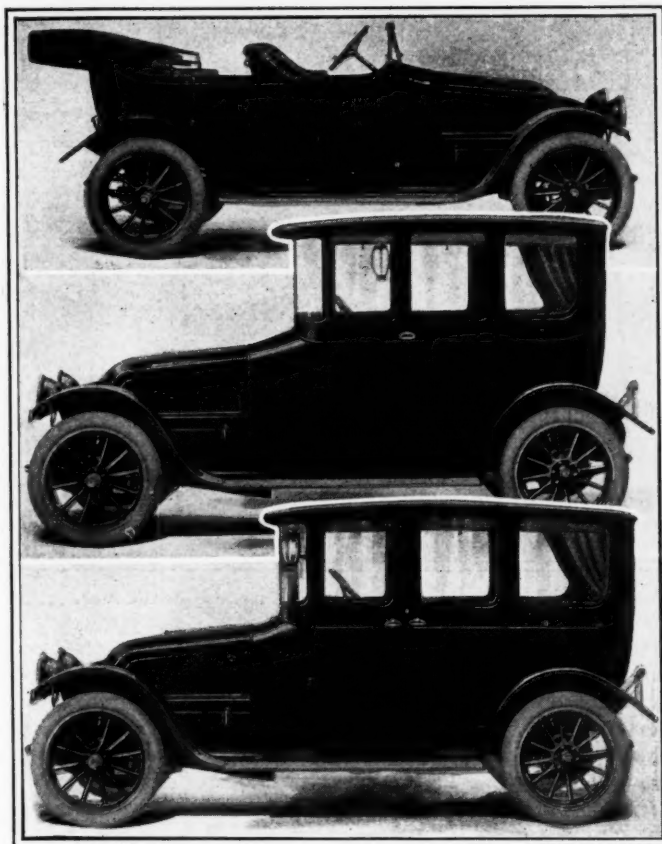
In the body work the front doors have been made wider and set back a little, permitting of easier passage in and out of the car. The mudguards are also wider to better protect the sides of the body from mud and water. They are made after the same pattern as the former mudguards, but the rivets are now invisible. The side lights have been eliminated and the headlights have been equipped with two bulbs. These are 12-volt types and are connected in parallel. The electric terminal connection has been moved under the cowl board and a trouble lamp with 12-foot cord is now supplied. The upper hinges of the door are concealed and the door handles are now on the inside. The battery location has been changed and while it was formerly invisible it is now both invisible and accessible, having been shifted from the chassis frame to a weather-tight box between the sill and the running board. The fuses are also located at this point so that it is easy to reach them for replacement.

Luggage Carrier Regular Equipment

Franklin is one of the few cars which fit a luggage carrier as regular equipment. The design of this, however, has been improved still further, and now folds up closer to the body. Extra tire carriers are also provided on the rear of the car. The instruments for the control of the car are now mounted on a cowl control board directly below the windshield. This board carries a speedometer, horn button, hand-pressure pump, hot and cold air control, carbureter adjustment, oil control, starting and lighting switches. This gives a neater and more compact bank of switches than the previous design. The speedometer is also better, being a 60-mile Warner with a more accessible and more readily disconnected drive.

Air Cooling Is Continued

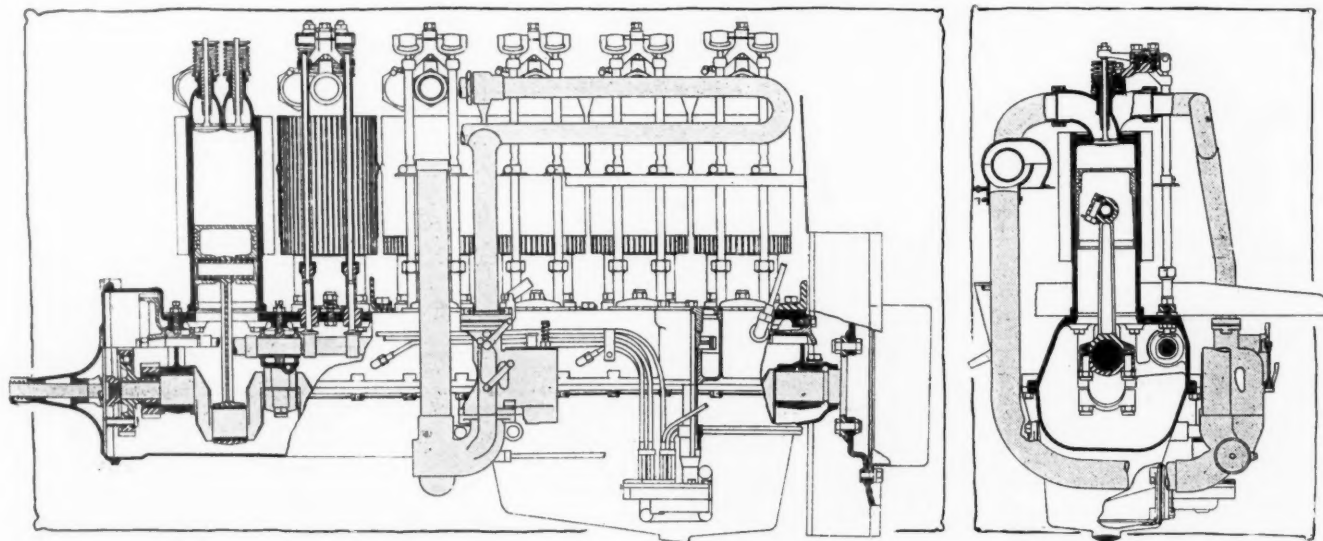
The air-cooling features of the Franklin car have not been changed. In fact, none of the typical features of Franklin design, such as the wood sills, elliptic springs and



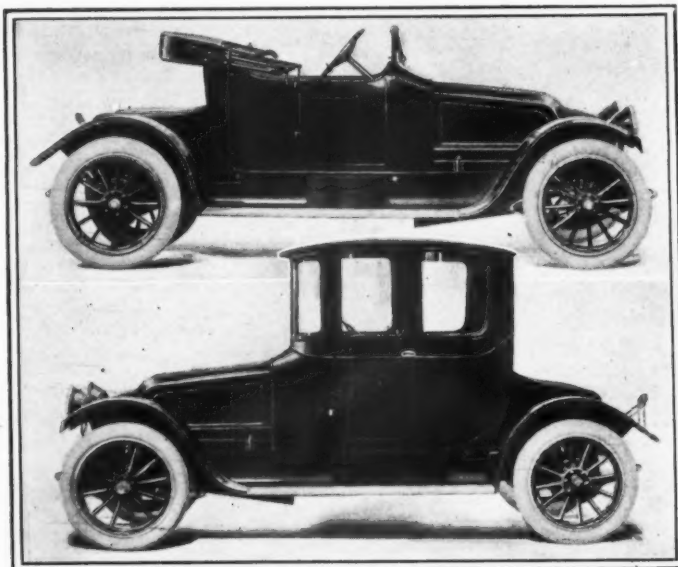
Three types of bodies which are standard on the Franklin chassis

light-weight methods throughout the car are altered in any way. The six cylinders are cast independently and have a bore of 3.625 inches and a stroke of 4 inches. The valves are located in the head of the motor and their method of operation is shown in a longitudinal section of the motor given herewith. Each cylinder has an independent valve mechanism operated by an overhead rocker arm and each valve can be removed and reassembled without interfering with any other mechanism. The vertical air flanges surrounded by metal jackets are the main source of heat radiation in the direct cooling scheme used on the Franklin cars. The fan is a product of the Franklin company, having a series of blades which resemble the blades of a turbine.

Seven main bearings of plain type are used to carry the



Side view of motor showing a section through one of the cylinders and an end section taken transversely



Franklin roadster and coupé bodies. Note the gentle hood slope

crankshaft. These bearings are babbitt lined and are hand scraped. The bearing supports are bridges in the upper part of the crankcase which is cut through in the horizontal plane of the crankshaft axis. These bearings are lubricated directly by a circulating four-speed system. The oil is taken from the reservoir in the lower part of the crankcase, and forced by means of a gear pump driven off the camshaft through a series of individual leads, one of which passes to each main bearing. The oil sight feed on the dash is in the direct circulation line, and by its use the operator can at all times note the amount of oil passing through the system.

Dyneto Starting and Lighting System

For lighting and starting the 12-volt Dyneto outfit has been fitted. In mounting this electric system the primary object has been to make the motor generator as accessible as possible and at the same time to place it in such a position that it would be most apt to remain clean. The system consists of a motor generator connected to the crankshaft by a silent-chain drive. A storage battery floats on the line. The winding of the motor generator is such that it acts as a generator at speeds of above 12 miles per hour and at this time begins to charge the storage battery. At speeds below 12 miles per hour the motor generator acts as a starting motor and is drawing current from the battery which is utilized in cranking the engine. When the car is stopped

there is a reverse current cutout which prevents the battery from discharging itself through the motor generator. For ignition an Eisemann magneto is used. This is mounted on the left and driven off the camshaft gear.

The Franklin company makes its own carbureter, and this season this will be found to be the same as in the previous model, except for the dash adjustment of the gasoline supply, which is a new feature. A rod operating on the needle valve and terminating on a ball-ended handle which is in easy reach of the driver secures immediate and perfect adjustment.

Emergency Fuel Arrangements

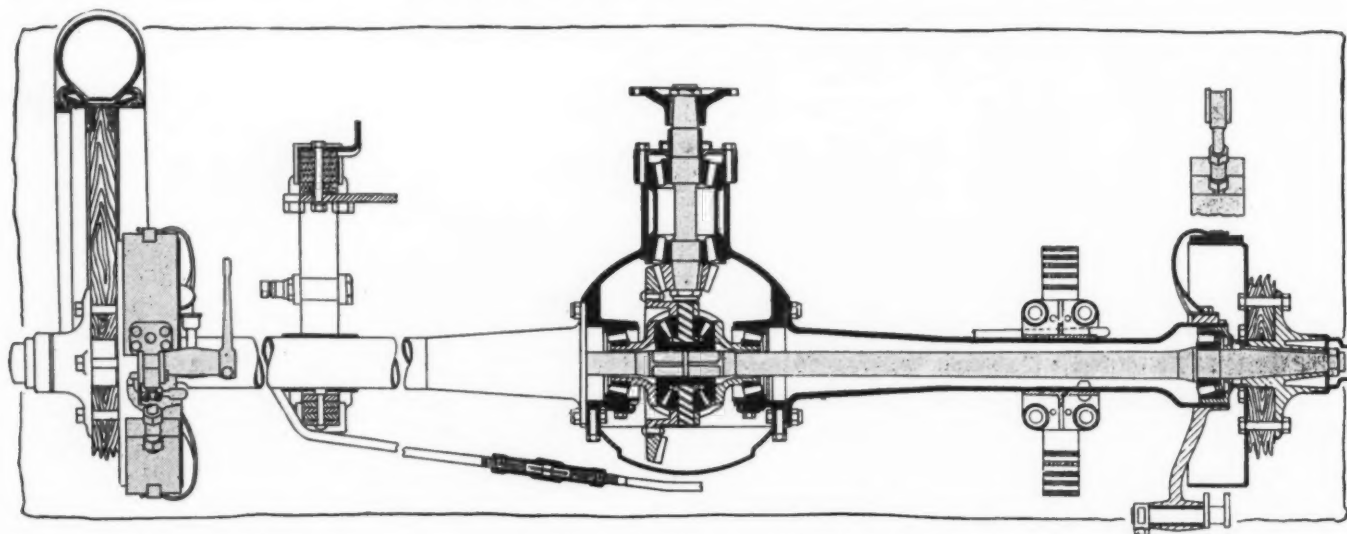
Gasoline is fed to the carbureter by gravity. The tank is located under the front seat and has a capacity of 14.5 gallons. There is a reserve tank of 2.5 gallons. There is a gasoline valve and separator in one fitting on the bottom of the gasoline tank and the handle for operating it is on the top of the tank, under the driver's cushion. The valve provides a main reserve and closed position and in this way the driver is always certain of sufficient fuel to reach the next supply station, should he be caught unaware.

No change will be found in the clutch. It is a multiple disk running in oil and is housed within the flywheel of the motor. A feature which is continued is the lubrication with graphite grease of the clutch trunnion by means of a cup carried on the sill of the car with a handle on the outside of the frame.

The amidship gearbox remains the same as in previous Franklin models. Three speeds are furnished and the gear-shifting mechanism is mounted in the center as before. On direct drive the reduction of the Franklin cars is 3.71 to 1. The rear axle is a semi-floating design which remains the same as in the series five except as the skew bevels replace the straight bevel. The differential and pinion shafts are carried on roller bearings. Taper roller bearings are used throughout the axle as will be noted in a reference to the sectional view of the axle given herewith. Aluminum is used throughout the car wherever possible, an example of this is the rear-axle gearcase which is a model of lightness.

Five Types of Bodies Fitted

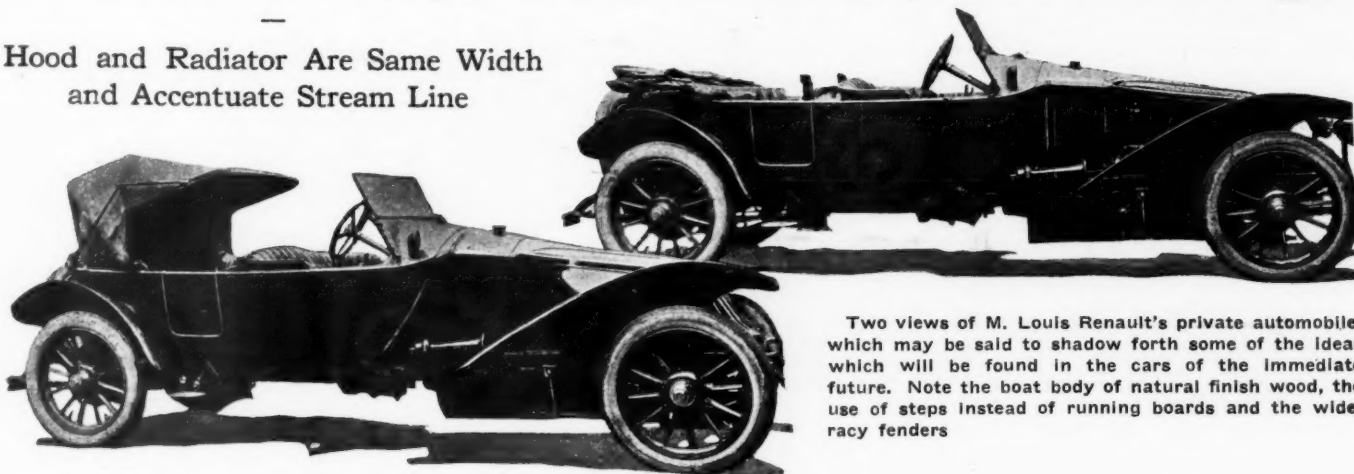
Five types of bodies are fitted to the one Franklin chassis. They are the touring car, roadster, coupé, sedan and berlin. The weights of these cars are respectively 2,750, 2,630, 2,788, 2,924 and 3,121 pounds, fully equipped. The standard color for all types is Brewster green with black trimmings. All the bodies are aluminum over a wood frame. The chassis frame is second-growth ash made in laminations. Full equipment is included in the selling price of the car.



Sectional view through the rear axle, which has not been changed except for the adoption of the skew bevel gear

Renault Has New Radiator Design

Hood and Radiator Are Same Width
and Accentuate Stream Line



Two views of M. Louis Renault's private automobile, which may be said to shadow forth some of the ideas which will be found in the cars of the immediate future. Note the boat body of natural finish wood, the use of steps instead of running boards and the wide, racy fenders

PARIS, July 29—Interest attaches to Louis Renault's private automobile by reason of the fact that it is the fore-runner of the cars which will be offered to the public for the 1915 season. No technical details regarding the car are available, but there are a number of features which can be observed by an external examination.

The most important of these is the new shape of radiator and hood. Instead of the radiator standing out wider than the hood, leaving a number of tubes exposed on each side of it, the rear of the hood is now the same width as the radiator and forms an unbroken line with it.

Radiator Is Lower

The radiator is also made considerably lower, so that the top of the hood, the top of the radiator and the scuttle dash form an unbroken line. In order to get the same cooling efficiency as when the tubes were directly exposed to the draft, the radiator is made considerably deeper than formerly and the rear portion of the hood is cut away and a metallic trellis fitted in each side. By this arrangement Renault maintains his sloping hood and yet secures the unbroken line which up to the present has only been attainable with the radiator in front design.

Boat Body of Wood

This chassis carries a special sporting type boat-built body polished in the natural wood. It is joined up to the radiator without any break in the continuity of the lines, and has a wind screen with the lower portion permanently tilted rearwards.

Steamship ventilator cowls are carried on the top of the scuttle dash in order to supply air to the fore compartment. Electric lighting is now a standard equipment,

the generating motor being at the fore end of the motor under the hood. Batteries are carried within the frame member, alongside the driveshaft.

Detachable Wood Wheels

This car is equipped with Renault detachable wood wheels, which now form a part of the standard equipment.

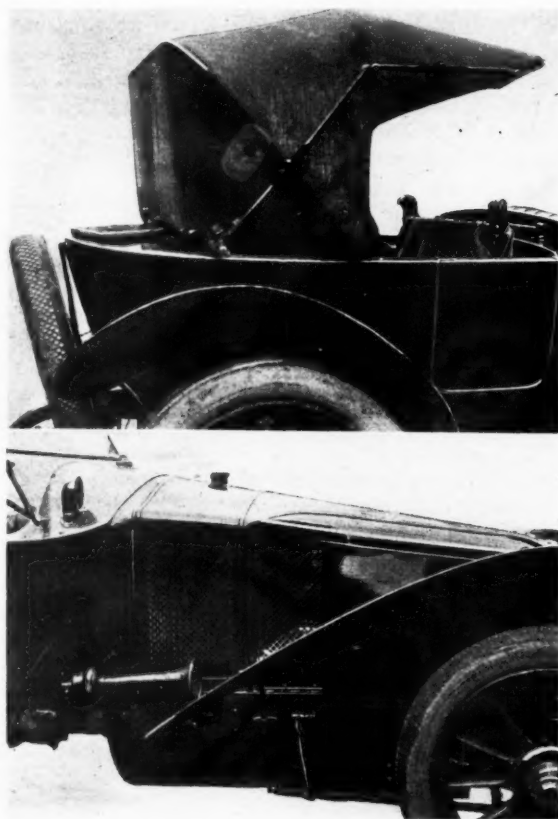
The boat-built body has no running boards, but merely a step for each door. The top is of the Victoria type covering the rear seats only. Right in the stern of the boat body is a tool locker, with admission to it through a hinged locker in the boat deck. Rear suspension remains unchanged, being provided by long semi-elliptical underslung springs.

Smooth Body Lines

An inspection of the accompanying illustrations will give the reader an idea of the attractive qualities of the design, the smooth sweep of the body lines and the harmonious blending of the radiator and bonnet.

One somewhat discordant note is the mounting of the electric horn on the outside at the right of the radiator. This, however, could easily have been avoided. The sweeping lines of the fenders give the car a racy appearance, which is heightened by the absence of running boards.

In the illustrations at the left some of the detail features of this new car may be seen somewhat more clearly than in the illustrations of the entire car at the top of the page. For instance, the method of carrying the spare demountable wood wheel at the end of the rear deck may be seen in the upper illustration which also shows the tool compartment in the rear deck, the robe rail at the back of the front seat and the Victoria top.



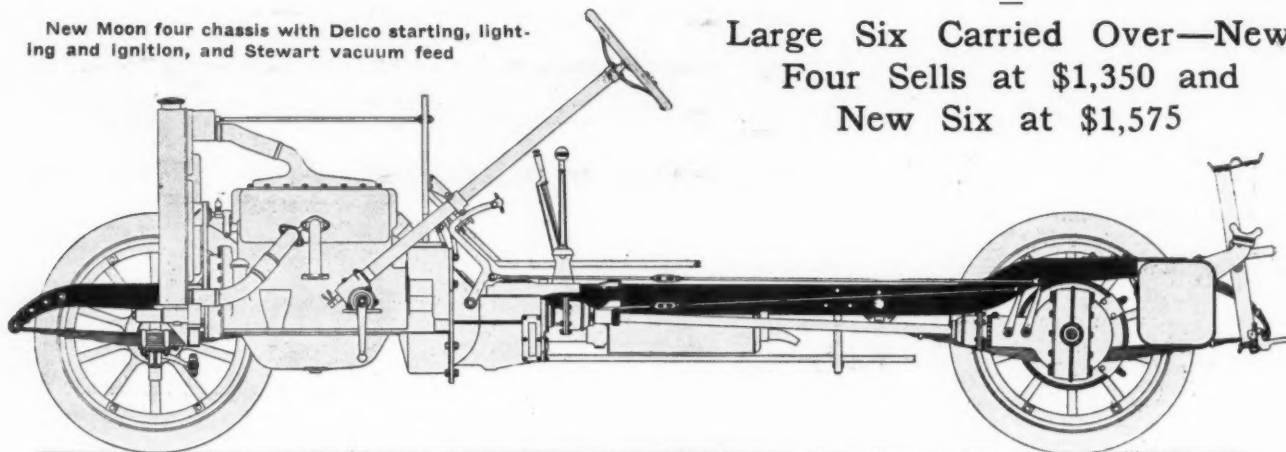
Above—Victoria type top and provision for carrying spare wood demountable wheel at rear. Note rear deck of boat body

Lower—How the radiator slopes into the hood on Renault car. Note steamship type ventilator in cowl

Moon Has New Four and Small Six

New Moon four chassis with Delco starting, lighting and ignition, and Stewart vacuum feed

Large Six Carried Over—New Four Sells at \$1,350 and New Six at \$1,575



THE 1915 season of the Moon Motor Car Co. is being confined to three models, two sixes and a four, of which only one, which is known as the large six, being a carried-over model. The two models are a four and a six, the four selling at \$1,350 and the six at \$1,575.

All three models use Continental motors, 1915 marking the close of the Moon-made motor in any models. These motors all lean to the long-stroke classification. The small four has cylinders 3.75 by 5. In the small six the sizes are 3.5 by 5 and in the larger six the cylinders measure 3.75 by 5.25. The four and small six use L-head block types and the larger six has the cylinders in blocks of three.

Other features of the line are Delco starting, lighting and ignition; Stewart vacuum gasoline feed; Hotchkiss drive from the rear axle to the frame in which the torque rod is eliminated, and improved streamline bodies.

Although all three models give evidence of Moon practice of 1914, there have been a number of mechanical changes with a view to decreasing weight, improving the riding qualities and giving better service. The new four and new six are equipped with roadster and five-passenger touring bodies only, at the price mentioned, while the larger six comes through with roadster, four-, six- and seven-passenger bodies. It lists at \$2,250.

The 4-38, the four-cylinder model, and the 6-40, the small six, entirely new cars for this season, are somewhat similar in construction and in the general outside appearance. The four has shown 21 miles to the gallon of gasoline according to the Moon company.

It is stated that this engine shows 44 horsepower at 2,200 revolutions per minute. An improved one-wire Delco starting, lighting and ignition system is used and an added feature this year is the Stewart-Warner vacuum feed by

which the carburetor is fed by gravity even though the fuel tank is located in the rear of the chassis. The engine drive is taken by a dry disk clutch and then by a three-speed selective gearset, both of these members, with the motor, forming a unit power plant. Both clutch and gearset are products of the Warner Gear Co., Muncie, Ind.

The propulsion of this car as well as the new six is by the Hotchkiss drive which eliminates the torque rod, simplifies the chassis and makes the springs take the driving strains. A new type of braking system is used in all the 1915 cars, designed by engineer H. L. Goodspeed who has reduced the number of system parts from fifty to twenty-two. In the 1914 cars an equalizer system was in use which required a long equalizing beam at about the center of the chassis. In the new system a more direct action from pedal to brake bands is obtained with the equalizing beam in the rear almost above the rear axle housing. Brake adjustment is easier and danger of binding from lack of lubrication is eliminated.

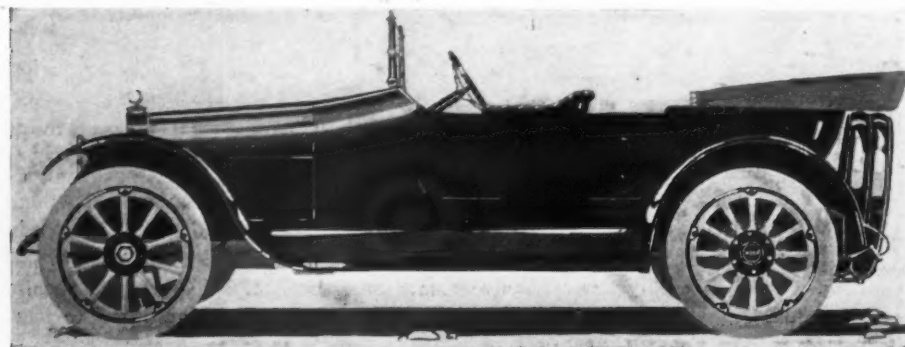
Underslung Springs on Four

The 4-38 has a wheelbase of 120 inches and has underslung rear springs which so lower the body as to give it a decidedly smart appearance. This body, as well as those of the other Moon cars, is of the true streamline type with a graceful curve from the windshield base to the radiator. The latter is a new one with a slightly rounded front. The driver's compartment has 44 inches of leg room and the tonneau is also comparatively roomy. Concealed hinges and locks, clean running boards, crowned fenders and other features in demand are to be seen. Drive is on the left with control levers in the center with the instruments well grouped on the cowl board. The headlights have dimmer control.

The new six possesses many of the features of the new four but with its longer wheelbase, greater power and light weight, supplies the demand for a car midway between a four and a heavier six. The Continental motor is of L-head construction, with cylinders cast in block. All Continental features such as helical timing gears, splash-pressure oil-feed, large bearings, etc., are to be seen.

Clutch and Gearset in Unit

The clutch and gearset, in unit with the motor, are of similar general design as those used in the four, but the parts are slightly heavier to care



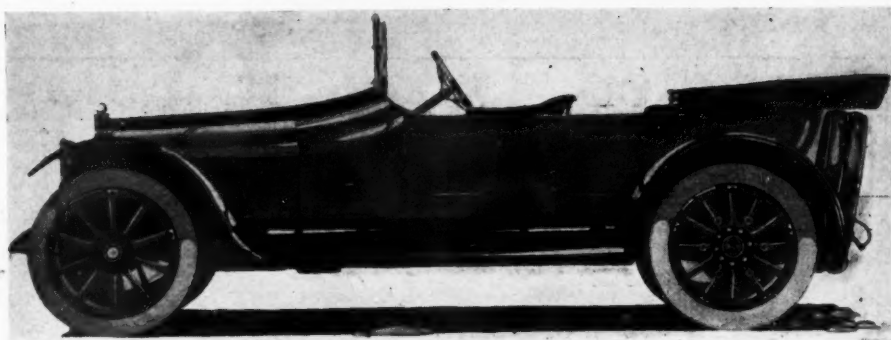
New Moon four-cylinder listing at \$1,350

for the greater strains. The drive from the three-speed gearset to the floating rear axle is by shaft and bevel gearing. The new brake equalizing system described in a previous paragraph is a feature of this car also. The springs are underslung and the drive is taken through them as in the four, eliminating all the usual driving members. In order to obtain a short turning radius the frame has been narrowed in front.

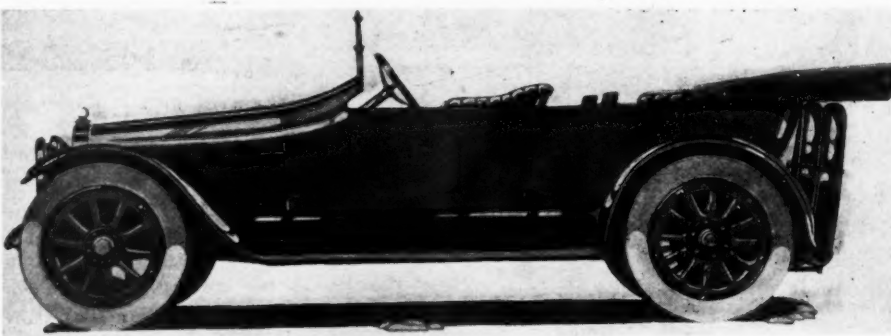
The streamline body is somewhat on the same order as that used on the four. Drive is left with control in the center and the cowl arrangement, carrying of the extra tires in the rear and the general interior body arrangement is the same as in the four. The wheelbase is 120 inches and the tires 34 by 4 inches.

Large Six Wheelbase Increased

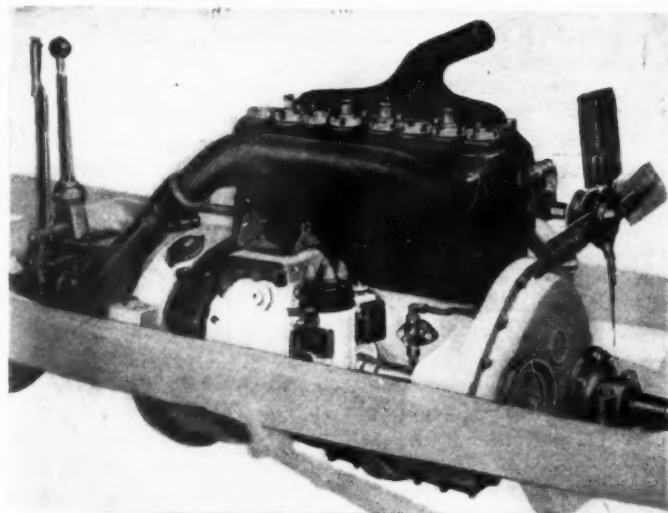
The changes in the 6-50 or large six are important ones. The wheelbase has been increased from 129 to 130 inches, the doors widened from 21 to 22 inches, the rear seat upholstery has been made deeper, more leg room has been provided for the driver and



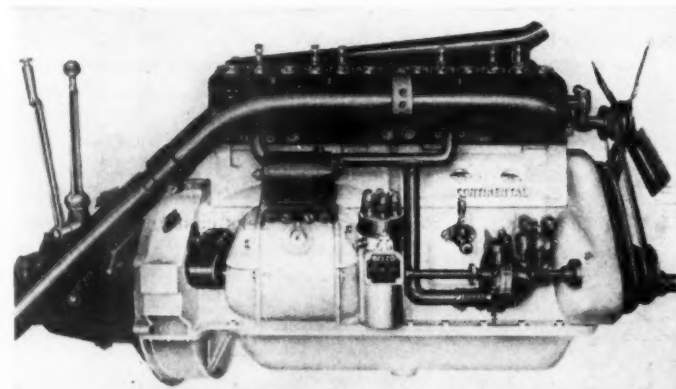
New Moon light six selling for \$1,575. It has a block motor. The drive is taken through the underslung springs, as in the four-cylinder car



Moon large six with L-head motor 3.75 by 5.25 inches



Exhaust side of Moon 4-38 motor for 1915



Exhaust side of Moon 6-40 motor used in light six. Note mounting of Delco electrical system

the tonneau extra seats are improved. The disk clutch has been reconstructed and the method of holding the plates changed so that wear is reduced. It is stated by the company that 150 pounds has been cut from the rear axle, due principally to the adoption of a crucible steel housing instead of the malleable iron one used in 1914. The brake drums have been increased from 14 to 16 inches in diameter, the silent chain drive of the Delco distributor adopted and a new braking system installed.

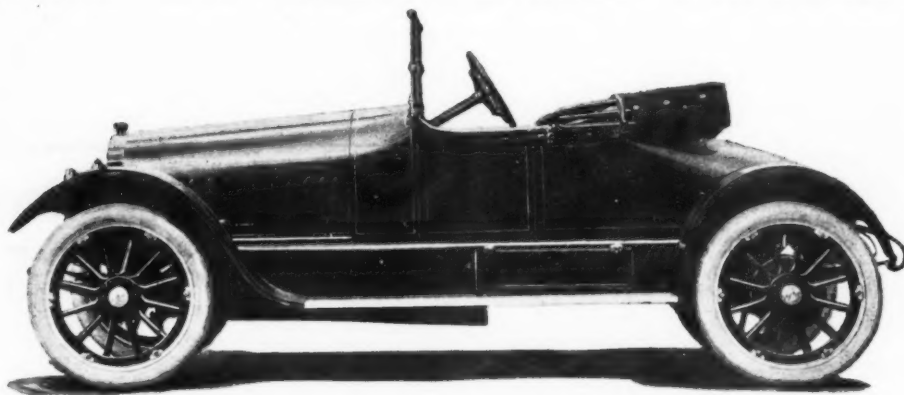
The body has very pleasing lines and the tonneau and driver's compartments are roomier. The tires used are 35 by 4 1-2 inches and the equipment includes Stewart-Warner vacuum fuel feed, headlight dimmers, top with boot which also covers the top bows, Delco system, clock speedometer and other instruments set flush in the cowl board and Collins curtains, as well as a Klaxon horn.

The carried over model, the 6-50, has the same engine as used in the 1914 model with improvements in detail and the equipment necessary to bring it up to date. The cylinders have a bore and stroke of 3 3-4 by 5 1-4 inches, and are cast in blocks of three. The Delco system of improved design has been installed and the circuit breaker feature of last year retained. With this breaker it is possible to tell whether there is an open or short circuit in the system. The battery for this system is an Exide and is placed behind the apron near the front right fender. Circulating splash oiling is used and cooling is by centrifugal pump driven by shaft from the timing gears.

The new type of disk clutch has been placed in this chassis but the gearset of last year, a four-speed affair, has been retained without changes. The floating rear axle and Moon one-piece axle housing are as before, with the exception that a reduction in weight has been made. The springs of this car are overhung and the drive is by torque members as in the 1914 model. The new type of brake equalizing system is used on this model. A rear axle feature is the centrifugal oil-draining device inside the hubs. This device gathers oil likely to make its way from the differential housing to the brake drums.

Unbroken Lines on 1915 Herff-Brooks

Price Unchanged on
Four and Six
—Steering Wheel
Hinged—Extra
Seat in Four



Smooth lines of 1915 Herff-Brooks six-cylinder roadster

TWO cars, a four and a six, are announced as the 1915 line of the Herff-Brooks Corp., Indianapolis, Ind., with unchanged prices at \$1,100 and \$1,375 respectively, but with a great number of mechanical and body changes which mark them as distinctive types of the coming season. A complete transformation has been effected by entirely new body lines, which give the cars a foreign look. The hood has no break, making a long sweep from the cowl to the newly shaped radiator, with generous curves from the cowl to the rear. But the fight for improvement has not stopped with the new bodies, for there are two other attractive features which stand out above the rest. The steering wheel of the 1915 Herff-Brooks four and six is of the folding down type. This wheel is hinged to the post on one side and when desired it may be folded back so that entrance and exit from either side of the car is easy. The five-passenger touring cars now contain an extra seat for a sixth passenger, this auxiliary chair folding into a tool box under the front seat. Right drive and center control have been abandoned on all models and left drive with center control adopted.

Wheelbase of Four Longer

Aside from the feature changes mentioned a number of mechanical improvements have been made in both four and six. The wheelbase of the four has been lengthened 2 inches, from 116 to 118 inches, and the bore increased from 4 1-8 to 4 1-2 inches. Bosch ignition supplants the magneto and dry cells of the 1914 four and six and a Stromberg carburetor is used instead of the one supplied previously. The old-style top gives way to an improved one-man top.

The six motor is of the L-head type with separately cast

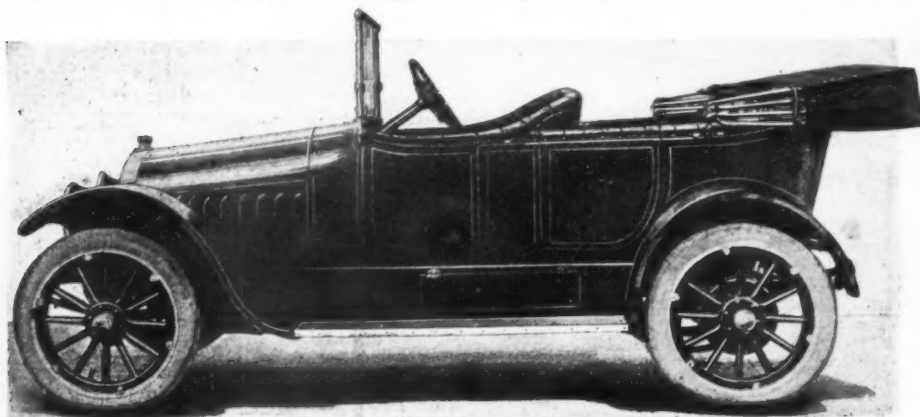
cylinders with individual valve inclosures to exclude dirt and house noise. The bore and stroke of this motor is 4 by 4 1-2 inches, the same dimensions having been used in 1914. Cooling is by pump circulation with the pump in front of the timing gear case, a rather unusual position for this member. Behind the pump is the new Bosch magneto and on the same side is the newly-adopted Stromberg carburetor. The right side of the engine is clean except for the crankcase breather and the water pipe. Lubrication is by splash-pressure in which oil is carried by a gear pump from a crankcase sump, sent through a strainer and then to a sight feed on the dash from which it makes its way to individual troughs under the connecting-rods.

Six Motor Has Seven Bearings

The motor having separately cast cylinders, calls for a crankshaft with more than the usual number of supports. Seven are used in this engine each 1 3-4 inches in diameter. The camshaft requires but three supports and this shaft operates push rods moving in square guides instead of round ones which are usually seen. The valves are 1 7-8 inches diameter and have a 5-16 inch lift. The timing gears are helically cut. A semi-steel mixture is used for crankcase metal and the case is supported by four arms cast with the crankcase. Every casting in this, as well as the four motor, comes from the Herff-Brooks foundry.

Clutch design has not been altered appreciably. The clutch is of the inverted cone type with spring inserts and incorporated with this clutch is a brake which prevents spinning when making gear changes. The gearset which is of the three-speed selective type has been redesigned to accommodate the center control feature, but the gears, shafts and general arrangement is the same as that used on the 1914 six. From the gearset to the rear axle no changes have been made. The inclosed drive shaft is equipped with one universal of large size and within this joint is a hollow brass compartment which holds sufficient grease to lubricate it for 5,000 miles. This is but one instance of removing the periodic greasing tour from the owner and in many instances oiling is taken care of automatically. The rear axle is of the semi-floating type and operates on ball bearings.

The new Aplco starting and lighting system is of the single-unit type, the motor-generator being driven by silent

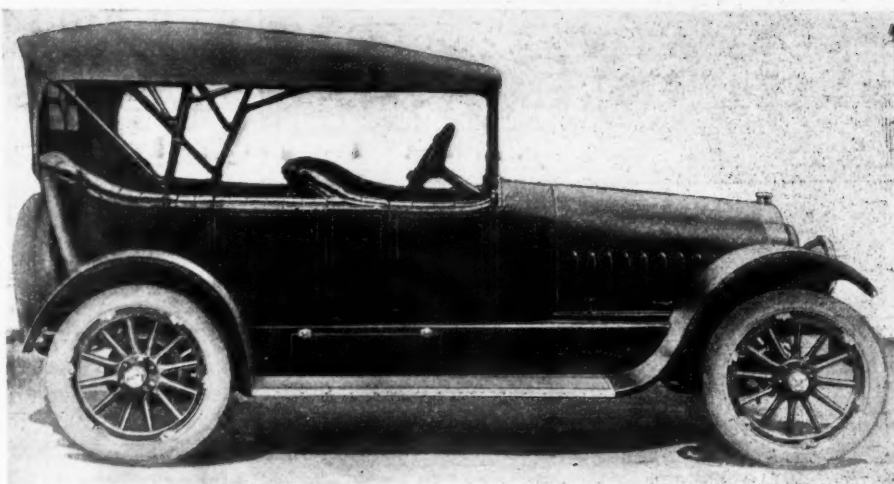


Herff-Brooks four-cylinder car with extra seat for sixth passenger

chain from the shaft extending from motor to gearset. The battery for this system is supported by steel hangers under the tonneau floorboards where it is accessible.

The new six body is much larger than the 1914 body and is an entirely new job throughout, as mentioned previously. All the instruments are finished in black and nickel and are mounted on a board where they can be reached easily by the driver.

The 1915 Herff-Brooks four has a larger motor, the new dimensions being 4 1-2 by 5 inches against 4 1-8 by 5 inches used in 1914. This engine is of the L-head type and has its cylinders cast in block. The oiling, cooling, carburetion, ignition, starting and lighting units are the same on the four as on the six and it differs only in general design. The crankshaft is supported by five bearings, the push rod guides are held in place by clamps, which practice is not used on the six. From the motor to the rear axle



Herff-Brooks six-cylinder with one-man top, smooth lines and clean running boards

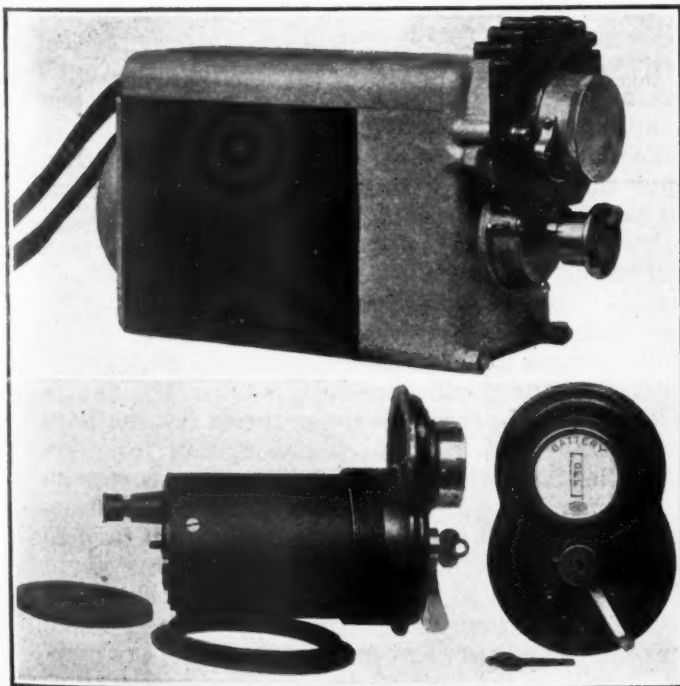
the four and six are similar in design, but the latter is smaller in proportion. All chassis receive a thorough test and are rigidly inspected before leaving the factory.

Samson Engineering Co. Brings Out Starter

THE Samson Engineering Co., recently incorporated under the laws of Kentucky, with a capitalization of \$350,000, and with headquarters in Louisville, Ky., will shortly have on the market a starting, lighting and ignition system.

One unit performs all these functions, and it is arranged to be driven at crankshaft speed. All reducing gears are integral with the machine. The wiring is extremely simple, using a grounded return. No cutout or regulator is used in this system, as the ignition switch connects the armature to the battery, and provision is made for automatically tripping this switch if it is left on by oversight.

The same voltage is used for the lamps as for the starting; this can be either 6 or 12 volts, as specified.



Samson unit starting, lighting and ignition system. Upper view shows complete unit and, lower, the dash coil and switch

The motor-generator armature is arranged in four multiple circuits, which by means of the brush arrangement allows the starting current to produce maximum torque and the generating current is produced by connecting the multiple circuits in series to produce low-speed generating values.

The starting switch is built into the generator and connects directly to a push-rod or pedal, there being no gears to mesh. The gear reduction is of such construction that the engine is free at all times. Arrangement is provided that a back fire from pre-ignition will allow the engine to reverse its motion without exerting a strain upon the starter.

The voltage regulation is taken care of by having the shunt field connected across one multiple circuit so that its current is tapered off in proportion to the voltage drop, due to the current increase in the armature turns.

The current delivered by the armature curve obtains its maximum at 400 revolutions per minute, and has a tapering characteristic from this point, diminishing approximately 50 per cent. at 1,500 revolutions per minute.

The transformer and breaker design is such that the current through the primary circuit is of equal value at high and low engine speeds, it being impossible by this method to get full efficiency from the engine at extreme high speeds without consuming too much current for the ignition at low speed. The ignition current being of such low value does not disintegrate the breaker points.

The ignition is automatically advanced and arranged for hand-control if desired.

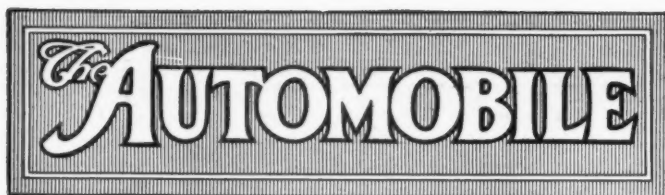
The dash coil carries upon its face an indicator showing the charging, provision also being made for emergency dry-cell ignition. A removable key is provided to lock the ignition lever.

The starter is designed so that it is easy to get to all points for cleaning and inspection. It is also dust and waterproof.

Two types of these starters will be put upon the market:

Type A, which is designed for the largest cars and weighs approximately 60 pounds complete. Type B, which is designed to crank a 3 1-2 by 5, six-cylinder motor, and weighs approximately 40 pounds.

The cranking speed on both these models is over 100 revolutions per minute, the current consumption being well within the range of a medium-sized battery.



PUBLISHED WEEKLY

Vol. XXXI

Thursday, August 13, 1914

No. 7

THE CLASS JOURNAL COMPANY

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E. M. Corey, Treasurer

231-241 West 39th Street, New York City

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 Other Countries in Postal Union, including Canada ----- One Year, 5.00
 To Subscribers—Do not send money by ordinary mail. Remit by Draft,
 Post-Office or Express Money Order, or Register your letter.

Entered at New York, N. Y., as second-class matter.

Member of the Audit Bureau of Circulations

The Automobile is a consolidation of The Automobile (monthly) and the Motor
 Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903,
 and the Automobile Magazine (monthly), July, 1907.

Two Tire Blades

THE effects of the European war have been brought closer to the American automobile owner by the increase in tire prices than was deemed possible a month ago. In a week the price of crude rubber has jumped from 55 cents per pound to \$1.10. Where the price limit is no one knows. The British ships, which bring the crude to our shores, are largely tied up by the war hostilities, and should a war of many months continue we would be confronted with a serious tire crisis by next spring.

"Making two blades of grass grow where one formerly grew" can perhaps to-day be applied in the tire field. If we can add 1000 miles to the life of a tire it should be done. Tire makers, in addition to boosting prices should start a country-wide campaign of education on greater tire care. Attention can be drawn to more careful watchfulness of the inflation pressures, to the more accurate alignment of the vehicle wheels and to the repairing of tread cuts to prevent water entering and rotting the fabric. There is ample room for missionary work of this nature. There is a big field in which to cultivate the second blade. A campaign for slightly slower speeds, cutting 5 miles per hour off, will accomplish much.

"I'll Find a Way or Make It"

WITH overcast skies and the smoke of battle filling Europe from corner to corner; with commerce on the high seas at a standstill with many companies to which American automobiles have been exporting; with some gates of motor car supplies from Europe locked by the armed hostilities, and with every country in the civilized world more or less directly or indirectly affected by the turmoils of war precipitated a week ago, the American automobile maker must view the situation calmly. Instead of weeping over what has already been lost and mooting over the gloom that the future may unfold, it is the better part to pin on the old Roman badge, "I'll find a way or make it."

But a short fortnight ago America was on the crest of its European export boom. Business was coming our way. The powerful cumulative force of years spent in developing export business seemed to be lending its impetus to increase future business. But just when the sun shone with brightest splendor the sullen boom of the distant guns was heard, and to-day the work of years seems temporarily suspended, and for how long no one but the gods can answer.

Already the dire results of the war are being experienced in America in spite of her neutrality. Sales of cars in those countries directly engaged in the war have practically ceased. Buyers are refusing to take deliveries in France, and the situation is still more acute in Germany. Before war was declared French factories had suspended all buying, some of them had partially closed down, and with the declaration of war it was expected that every factory would close its doors. For the time production in Europe has practically ceased, but still supply is not dropping behind demand because demand ceased at the same instant.

Our makers will have to turn to other fields. To our south lies another continent, South America, settled largely by those of Latin origin, with Anglo-Saxons in some parts. At present Europe commands the big business in Brazil, in Argentina, in Chile and the other countries in South America. Germany has had large trade with them; France has enjoyed a large percentage of the business, as has Italy. These countries of South America must now look to the United States for many of the products that they have been purchasing in Europe, but which they cannot obtain at present. Here lies the opportunity for our makers. Already several have begun cultivating the South American market, the efforts covering 6 or 7 years, but the progress has not been up to par. To-day offers an opportunity for more intensified cultivation of this field as an export market. American car builders who have received orders to cancel all shipments to Europe can turn to the South. Accessory makers, and there are many of them confronted with similar cancellations, will have to follow the same policy, and where 12 or 20 per cent. of their product reached the European market, it will be the task of developing a new market for this in South America.

Rubber Shipments Affected by War —Tire Prices Climb

Values of Crude Product of Plantation Quality Rise from 55 Cents a Pound on August 1 to \$1.10—Eastern Sailings Cancelled—
Brazil Season Off

NEW YORK CITY, Aug. 10—Crude rubber has reached the remarkable market price of \$1.10 a pound for plantation quality and \$1.12 for Para, climbing since August 1 from respective prices of 55 and 70 cents.

This doubling of values of the important commodity is due to the effect of the European war on shipments of rubber from the great plantations of Ceylon and the Malay states that produce two-thirds of the world's supply. All Far Eastern rubber cargoes are cleared out of Singapore for London, the primary rubber market. Sailings from both of these ports have been cancelled.

The establishment of an American merchant marine or a decisive battle at sea or peace are the only vistas of hope that importers hold up to the automobile industry.

Stores of free—non-contracted—crude rubber in New York City, it is said, do not exceed 500 tons. London has about 1,000 tons collected on shipping docks. Perhaps 1,000 tons are now en route for and about 1,000 tons actually being unloaded in this country.

Altogether the supply in sight appears slim when it is realized that the consumption in America is about 65,000 tons a year.

And there is no hope from Brazil or Mexico at this time, say the importers.

"A small stock probably has accumulated in Brazil and Para that wouldn't last one of our factories a few days," said Francis R. Henderson, of the rubber importing firm of Henderson and Korn today.

"This small stock will reach us easily as shipments from Brazil have not yet been affected—and they probably won't be. The Booth line, English, controls the Brazilian shipping, of course, but there is talk of turning over all of the business to the Lloyd Brasileiro, the Brazilian line that sold out to Booth. Under the neutral Brazilian flag, cargoes will come safely and regularly.

"But this doesn't help the rubber situation a trifle. At this time of the year nearly all of the world's supply of rubber comes from Singapore. As a matter of fact, most of the world's supply of rubber at any time of the year clears out of Singapore, coming from Ceylon and the Malay states, largely the latter.

"The Brazilian crop moves from October 1 to April 30. Rubber is not gathered during other times of the year, as the country is flooded with torrential rains and the plantations have to be abandoned. During the harvest season there is a steady market, so that no stores are permitted to accumulate. Therefore, we can not depend on Brazil until after the first of October and then only for normal quantities.

"The normal Brazilian rubber crop is now about 40,000 tons. American industries consume between 65,000 and 70,000 tons a year.

"The great rubber fields of the Far East, however, produced 70,000 tons in the last year and that is why all eyes in the rubber world turn East. The crop is an all-year-round one. Incidentally, the rubber harvest is now in Ceylon and Malay, the yield being very small until about 10 years ago when it suddenly began to pick up and outstripped all others.

"Mexico offers no hope. The little crop there of past years probably is zero this year because of the revolution. Mexico couldn't keep one factory busy a week.

"We have no idea what factory stocks may be. Factories buy from us.

"There is nothing that we can do to relieve the situation. It seems to be up to the United States just now. No banking relief is needed. What we need is ships, ships that won't be interfered with on the high seas, and plenty of ships."

Most Tire Companies Advance Prices 10 to 20 Per Cent.

NEW YORK CITY, Aug. 10—The price of tires has been raised by nearly all the larger tire companies from 10 to 20 per cent. The action is due to the effect of the European war upon the crude rubber situation, the price of the crude product having advanced 100 per cent. in the eight days ending last Friday, August 7.

Crude rubber is just as plentiful as ever, but the war has tied up the London rubber market, through which most of the rubber used in the United States is bought, and English ships, which carry most of the rubber from East India and Brazil, are wary about navigating when hostile battleships are likely to molest them.

After affairs adjust themselves it may be possible for neutral vessels to supply the demand by transporting Para rubber from South America; also the war may not last long, all of which may relieve the situation; but as it is the majority of American tire builders have no more than enough to last them from six weeks to three months.

The tire-buying season, however, is about over, July and August are the two big tire months of the year and in September the demand falls off as touring declines. For this reason tire manufacturers generally carry a low stock of crude rubber at this time of year and work the made-up stock down low in cleaning out for the following season.

Also since manufacturers with long-time contracts were badly "stung" a

couple of years ago when the price dropped they have bought more or less from month to month ever since and none of them carry very heavy stocks. Whatever contracts exist are for a certain quantity to be delivered every month and at this time the rubber traders are unable to fulfill their contracts.

Price Movement in Principal Makes of Tires

Make of Tire	Per cent of Increase	34 x 4 Size						Date in Effect
		Plain		Non-skid		Tube		
		Was	Is	Was	Is	Was	Is	
Empire	12.5	\$24.35	\$27.40	\$30.50	\$33.85	\$5.45	\$6.25	Aug. 11
Federal	12.5							
Firestone	12.5-15	26.20	29.45	30.50	33.85	Gray 4.90	5.65	Aug. 7
						Red 5.45	6.25	
Fisk—Bolted-on	15	30.30	34.85	36.35	41.80	5.60	6.45	Aug. 8
All others.....	15	26.25	30.30	31.60	36.35	5.60	6.45	Aug. 8
Goodrich and Diamond.	12.5	24.35	27.40	26.05	29.30	Red 5.45	6.15	Aug. 8
Silvertown Cord.....	12.5	38.55	43.35	41.25	46.40	Gray 4.90	5.50	Aug. 8
Goodyear	20	24.35	29.20	28.50	34.20	4.90	5.90	Aug. 6
Kelly-Springfield	None will be made.							
Lee	None as yet.							
McGraw	Probably will advance.							
Michelin	None expected to be made.							
Overman	None to be made for the present.							
Pennsylvania	12.5	Prices being adjusted.						
Racine	None as yet.							
Republic	About 12.5 to 15.							
Swinehart	No raise. 10 per cent cut from dealers' and consumers' discounts.							
United States.....	12.5	24.35	27.40	33.55	37.75	Red 5.42	6.15	Aug. 8
						Gray 4.90	5.50	

The price of tires, beginning nearly a year ago, dropped a total of 28 per cent. This was due to competition and a low price for crude rubber. The present increase has sent it about half-way back and whether other increases are contemplated would not be stated by the tire men.

Should the war end in a short time, one tire man stated, the price of crude rubber would probably go lower in this country than it had been. This, he said, would be caused by the inability of European factories to recover their normal condition and take the rubber offered by the world's markets, all of which rubber would be sent to this country and glut the market.

Present Advance Based on Apprehension

The tires which are being sold at the present time and on which the price has been raised are not being made from the crude stock on which the price jumped. The increase in tire prices is based more upon a feeling of apprehension as to future conditions and it will be several weeks in most cases before any of the high-priced crude is made into tires.

Because of this some of the manufacturers have declined to raise until the cost of production increases. The Kelly-Springfield, Ajax-Grieb and Michelin companies are standing pat on their former prices, and the attitude of those who state that they will not raise is indicated in the statement of Van H. Cartmell, president of the Kelly-Springfield Tire Co.:

"We always base our selling price on our manufacturing cost," he stated, "and while we are able to manufacture at former and present prices we shall not raise the retail price of our tires. If the war should continue and it becomes necessary for us to make future purchases of crude rubber at advanced prices we would increase the selling price in proportion to the advance in the manufacturing cost."

Horace De Lisser, chairman of the Board of Directors of the Ajax-Grieb Rubber Co., expressed a like sentiment. Mr. De Lisser urged manufacturers to maintain an attitude of calm and said no increase would be made in Ajax tires until the cost of making them was increased by the necessity for purchasing crude rubber at advanced prices. This company is not heavily stocked with crude or tires, but is selling at former prices.

The increases made range from 10 to 20 per cent., the average being from 12.5 to 15 per cent. The highest increase was made by the Goodyear Tire & Rubber Co., Akron, O., which advanced 20 per cent. The Fisk Rubber Co., Chicopee Falls, Mass., was next in line with 15 per cent.

Goodrich and Diamond tires went up 12.5 per cent., as did Empire, Pennsylvania, Federal and United States. Republic's increase, like that of Firestone, ranges between 12.5 and 15 per cent.

Kacine, Lee, McGraw and many others, many of them lesser manufacturers, have not made advances and state that they have not yet made decision. In many cases, however, the "little fellows" plan to imitate the big ones.

Instead Cuts Discounts

Swinehart did not raise its list price, but instead cut the discounts given to the dealer and the consumer. Where the dealer got, for instance, 10 and 10, he now gets 10 only, and where the consumer got 10 and 5 for cash, he now gets 5 for cash. The dealer is credited with having cut from the list under the previous arrangement, so that in order to make his former profit he will have to sell at list without a cut.

The dealers' discounts remain unaltered in other cases. They range from about 15 to 25 per cent. In some cases there will be a slight adjustment, but it will not be radical.

The movement in solid tires is erratic. United States boosted the price 15 per cent., while others state that they will not raise or have not made decision. It was stated by one tire man that the price of solids would not necessarily follow pneumatics inasmuch as solids may be built of less costly material and still be highly satisfactory. Para and a cheaper rubber—sometimes reclaimed—is used in solid tires. Firestone made a move in solids like that of Swinehart in pneumatics and cut the discount by 10 per cent. of the list.

Tire importers have supplies on hand for about six months and hope their European factories will be running again by the first of the year. In New York there are several imported tires; Prowodnik, made in Riga, Russia; Englebert, made in Liege, Belgium; Gaulois, made in Clermont-Ferrand, France.

The Gaulois Tire Corp. luckily got in three separate cargoes early this week and is well fixed. The Columb Tyres Import Co. has a good stock of Prowodniks. The Englebert Tyre Co. received cable advices that the factory, which is on the battle line of the Belgian and German armies, is at present practically at a standstill, Belgians being busy at other things than tire building. Prowodnik plans to raise its prices about 10 per cent.

United States Has 1,548,350 Cars

(Continued from page 297.)

cars are licensed once every 3 years instead of every year. Louisiana, Mississippi and South Carolina continue to have their automobilists register with the local authorities, there being no state registration.

Lack of Uniformity

It is to be deeply regretted that there is so little uniformity about the automobile laws in the various states as this aspect of the situation is not only very inconvenient to tourists, but it also renders it very difficult to obtain statistics and especially so in regard to the various classes of vehicles, comparatively few of the states segregating these.

Many Delinquent Licenses

Referring to the table of registrations on page 297, it will be seen that there is apparently a decrease in registration in Georgia, Kentucky, Louisiana, Mississippi, Montana, Oklahoma and Washington. Telegrams to the respective Secretaries of State of Georgia, Montana, Oklahoma and Washington brought out the fact that the apparent decrease is due to delinquent licenses, while in Kentucky the new law is responsible for the lower registration and in Mississippi and Louisiana lower and more accurate estimates have been secured.

Owing to the incomplete registration figures, only twenty-five of the states were able to give information in regard to the number of chauffeurs in the state. Four of these stated that no chauffeurs were registered and the total number of the chauffeurs registered in the other twenty-one states was 271,858.

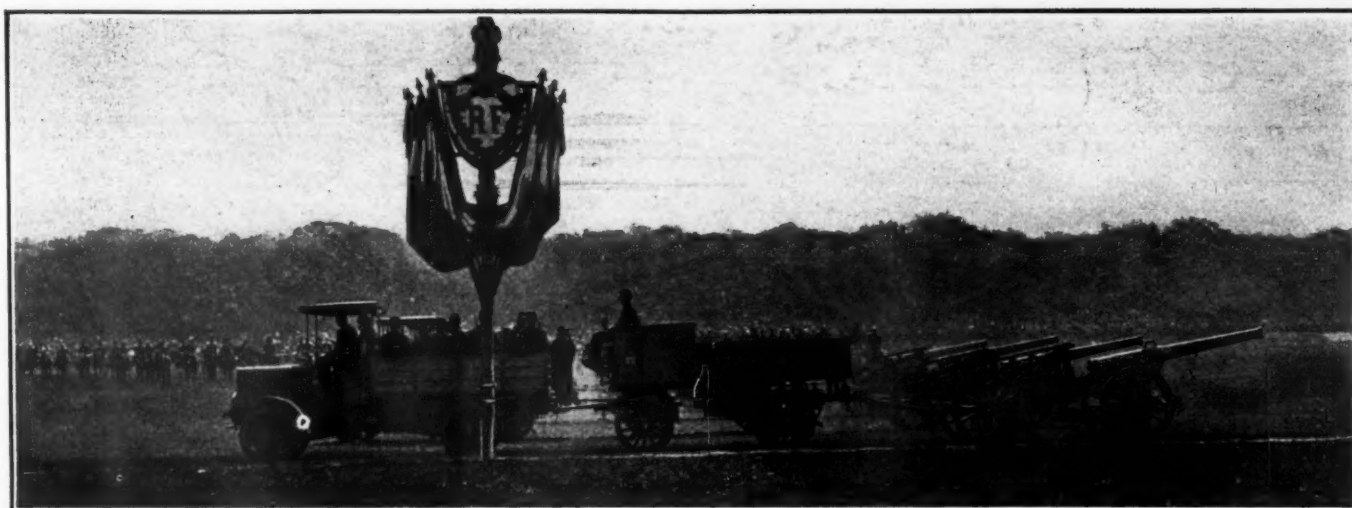
Thirty-four states were able to give the total in fees received, which amounted to \$7,812,907, two states having over \$1,000,000 income from this source, New York with \$1,351,826 and Pennsylvania with \$1,067,295.

Of course, the totals in the table on page 297 are very inadequate for the number of gasoline passenger cars and trucks and electric passenger cars and trucks, figures being available in comparatively few of the states. Such as are given, however, are significant.

Pierce Offers 54 Body Types

(Continued from page 303.)

ever before. Wire wheels may be secured at an extra cost but the standard cars are fitted with wood wheels having the Johnson patent demountable rims. The extra tires and rims are carried on the running board and this year the Silvertown cord tires will be found as standard equipment. In addition to the actual constructional features of the car all models will be regularly equipped with hand inspection lamps, and a full instrument board which includes the clock, speedometer, odometer, oil and gasoline pressure gauges, voltmeter, ignition and light switches and starter button. Magnetic gasoline tank gauges are now fitted on the tanks. In addition there is the power-driven air pump for inflating tires, a bulb and electric horn, collision bumper, trunk rack, shock absorbers, a supply of oils and grease, extra valve and spring, storm curtains, mud aprons, ventilators, tonneau lamp and in enclosed cars there is an adjustable foot rest, Waltham clock, umbrella holders and everything else that makes for luxury.



Four-wheel drive tractors hauling heavy guns in annual military display at Longchamps

War Injures Only European Trade

Will Not Hurt Commerce with British Oceania or U. S. Territories

WASHINGTON, D. C., Aug. 8—While the European war is sure to cut deep into the foreign motor car trade of this country, government officials here believe that markets in South America, Asia, Oceania, Africa, to say nothing of the noncontiguous territories of the United States, will be productive of much business within the next few months. That the war, if continued for any length of time, will be a serious blow to American motor car makers is conceded by all acquainted with conditions abroad, but government officials charged with the duty of advancing export trade assert that many markets now practically untouched can be made productive if proper means are taken to exploit American cars. Canada, of course, will continue to take many cars and is likely to prove the one best bet in the sale of cars abroad.

At the present time, leaving out Canada, British Oceania is our best customer for motor cars. During 1913 Australia and Tasmania took 2,083 pleasure cars, valued at \$1,896,990, and seventeen commercial cars, valued at \$23,027; New Zealand took 958 pleasure cars, valued at \$990,837, and one commercial car, valued at \$1,201. Minor shipments were made to other parts of Oceania, together with more than \$200,000 worth of parts.

In South America our best customer is Argentina, which in 1913 took 1,062 pleasure cars, valued at \$1,181,735, and thirty-five commercial cars, valued at \$78,000. Shipments of parts, not including engines and tires, were valued at \$74,138.

Brazil is the second best customer in South America, that country taking last year from this country 987 pleasure cars, valued at \$1,035,247, and thirty-six commercial cars, valued at \$75,073, and parts to the value of \$108,859. Colombia followed with the importation of 110 pleasure cars, valued at \$113,334, together with three commercial cars, valued at \$6,112, and parts to the value of \$18,676.

The Central American states are small buyers, Costa Rica, Guatemala, Honduras, Panama and Salvador, buying only eighty cars in 1913.

Just to show what a ripe field is awaiting American motor

car manufacturers in foreign lands, the following quotation from a report sent by Consul General Sammons, at Shanghai, China, is interesting: "The interest in motoring, among both the native and foreign populations, is steadily increasing in Shanghai and other parts of China. The increase in the importation of American cars continues. As far as can be ascertained the total net importation of motor cars for China during 1913 amounted to \$359,862, being an increase of \$180,676 over the previous year."

In this connection it is also interesting to note that the salary of a Chinese chauffeur, according to Consul General Sammons, is from \$15 to \$20 a month.

Figures compiled from official records show that during 1913 Europe took 233 commercial cars, valued at \$198,277, and 7,555 pleasure cars, valued at \$6,044,229. To offset this North America took 554 commercial cars, valued at \$1,147,622, and 7,460 pleasure cars, valued at \$9,164,078; South America purchased 105 commercial cars, valued at \$214,773, and 2,715 pleasure cars, valued at \$2,950,432; Asia, 26 commercial cars, valued at \$46,698, and 1,631 pleasure cars, valued at \$1,418,090; Oceania, 63 commercial cars, valued at \$119,437, and 3,573 pleasure cars, valued at \$3,481,618; Africa, 12 commercial cars, valued at \$10,334, and 1,359 pleasure cars, valued at \$1,217,346. Exports of parts to these five grand divisions of the globe aggregated in value \$5,240,599 in 1913, of which \$1,272,881 went to Europe, \$3,259,830 to North America, \$275,295 to South America, \$105,132 to Asia; \$260,779 to Oceania and \$66,682 to Africa. In addition more than half a million dollars worth of motor cars and parts were shipped to the noncontiguous territories of the United States during 1913.

A Rim and Tire Standard in Europe

PARIS, July 29—Official announcement will shortly be made by the general secretary of the International Union of Automobile Manufacturers of the general adoption by all European countries of the S. M. M. A. standard for rims and tires. The British standardized millimeter rim was decided upon in June of last year and tolerances adopted in September, 1913. The Society has purchased a complete set of rim-checking templates and printed specifications covering its standard. This British standard was brought before the International Union of Automobile Manufacturers, which comprises the makers in every European country, and after a certain amount of discussion was adopted by them in its entirety. The official notice may go out in a few days, and the result will be to standardize the whole of the pleasure car rims in European countries.



Members of British Institute of Automobile Engineers in front of F N factory at Liege

Big Competitions Off in France; War Stops Army Trials

**Racing and Touring Calendar Annulled
—International Cyclecar Trials Abandoned
but Grand Prix de France May Be Run**

PARIS, FRANCE, Aug. 1—With threats of a general war in Europe, all automobile demonstrations in France have been cancelled.

The International 6-day trials for cyclecars and motorcycles, which should have been held in the Alps next week, have been indefinitely postponed. President Poincaré's official automobile tour through the Alps has been abandoned. The annual trials for army automobile trucks, which has been in progress around Versailles for the past 3 weeks, has been ordered to be stopped, the vehicles still in the competition being accepted as suitable for the government subsidies, and all being ordered to remain at the disposition of the government.

The three races at Le Mans on August 15 and 16 have been kept on the program and will be run if the political situation improves, while the date for receiving entries has been deferred. There are three distinct events: the Grand Prix de France for 4 1-2 liter cars, the motor cycle and cyclecar Grand Prix, and a light car race. It is now certain that neither Delage nor Mercedes will run in the Grand Prix de France; this practically leaves the race in the hands of Peugeot, for their only serious rival is Schneider.

No Curtailment by Continental Motor Co.

DETROIT, MICH., Aug. 10—The Continental Motor Manufacturing Co. denies absolutely that there will be any let up in the activities of the concern pending the European war because of difficulty in obtaining certain alloys and high-grade metals, of which the concern is one of the most extensive users in the world. In fact, the outlook for the business is such that the extensive additions to the plant started some time ago will be pushed along as much as possible. These additions consist in wings to the testing and machine shops, and a large amount of new machinery is being added to the general equipment. From now on the Continental company will also make all the metal stampings used in its various models of motors.

De Palma Arrives with Grand Prix Mercedes

NEW YORK CITY, Aug. 7—Ralph De Palma arrived to-day with one of the Grand Prix Mercedes after an exciting getaway from Germany, because a few hours' delay would probably have prevented him obtaining the machine.

De Palma will drive his new mount at Elgin and possibly at the Vanderbilt and Grand Prize races at the Panama-Pacific international exposition next winter.

If De Palma can win another Vanderbilt cup race, the

Vanderbilt trophy will become his permanent property. Should De Palma decide not to drive the Mercedes he may be seen at the wheel of the Vauxhall, which he drove in the Grand Prix on July 4. While he had transmission trouble then, he believes the car's motor to be the most phenomenal he has seen.

British Engineers Just Back from Liege

NEW YORK CITY, Aug. 10—It is of interest to note that on the recent trip of the British Institution of Automobile Engineers to Belgium, Liege was one of the places visited. The Minerva and F N works were inspected, the former concern is a well-known manufacturer of Knight-motored automobiles, while the latter produces automobiles, motorcycles and firearms. It is only known in the United States as the producer of one of the first four-cylinder motorcycles, a large number of these machines having been imported several years ago.

Kelly-Springfield Sells 1,000 Trucks

SPRINGFIELD, O., Aug. 10—One thousand Kelly-Springfield 1-ton trucks have been purchased by the National Pure Water Co., Kansas City, Mo. This tremendous order will be delivered at the rate of 100 per month during 1915.

The National Pure Water Company has the exclusive rights and patents on a new hydro-electric water purifying machine. It is the intention of the company to lease these machines to agents in all sections of the country. When the agency is taken over, a complete outfit, including motor truck, settling tanks, cooling stands, bottles, etc., is sold by the National Pure Water Company. In this way the equipment of every agent will be uniform and the parent company will know that they are properly equipped to handle all business in the right way.

The contract signed by the National Pure Water Company provides not only for delivery of one thousand trucks but they further agree to allow The Kelly-Springfield Motor Truck Company, Springfield, O., to furnish all gasoline driven motor truck equipment which may be purchased.

The trucks are to be uniformly equipped. Each is to have a platform body to carry 54 five-gallon bottles of the pure water.

The chassis will be the standard Kelly-Springfield K-30 with 120-inch wheelbase and 9-foot loading space back of driver's seat.

Rudge Whitworth To Send Manager Here

NEW YORK, Aug. 10—John Pugh, manager of Rudge Whitworth, Ltd., will sail for New York August 19 to visit several factories in the automobile industry. Mr. Pugh has been one of the leading exponents of the wire wheel in Europe.

Ford Price Reductions Rule in Canada

FORD, ONT., Aug. 8—Buyers of Ford cars in Canada are to share in profits from August 1 of this year to August 1 of next year. Prices have been reduced as follows: Touring car now \$590, formerly \$650; runabout now \$540, formerly \$600; town car now \$840, formerly \$900.

Should the Ford company be able to obtain the maximum efficiency in factory production and the minimum cost in the

purchasing and sales departments and can reach an output of 300,000 cars between the above dates, and should they reach this production they agree to pay, as the buyer's share, from \$40 to \$60 per car on or about August 1, 1915, to every retail buyer who purchases a new Ford car between August 1, 1914, and August 1, 1915.

300 Dealers at Jeffery Convention

KENOSHA, WIS., Aug. 6.—Discussions, tests and entertainment occupied the time of 300 dealers attending the annual Jeffery convention this week.

The Jeffery Chesterfield Six was explained in all its details and the dealers were enthusiastic in approving the new model. Talks were made by L. H. Bill, assistant general manager, and E. S. Jordan, secretary and sales manager. It was emphasized that the Jeffery policy is to share with dealers all fruits of its sales experience as well as engineering practice.

Truck Club To Hold Detroit Convention

NEW YORK CITY, Aug. 12.—In response to the general feeling that motor truck interests should get together, the Motor Truck Club of America has plans on foot for a motor truck convention to be held in Detroit on October 7, 8, 9 and 10. Other associations have been invited to join the convention. Yesterday Mr. George H. Duck, president of the club, completed arrangements with the Detroit Bureau of Commerce to hold the meetings in the convention hall of the Cadillac Hotel, which seats 1,000 persons. The Motor Truck Club will have its representative in the office of the Detroit Convention and Tourists' Bureau of the Detroit Bureau of Commerce.

J. Lee Barrett, secretary of the bureau, has been placed in charge of arrangements, accommodations, etc. At a meeting of the trade held yesterday afternoon, the convention was given hearty endorsement and local committees appointed.

S. V. Norton, of the Packard Motor Car Co., was appointed chairman of the general committee; M. L. Pulcher, of the Federal Motor Truck Co., chairman of the finance committee; John H. Thompson, of the Thompson Auto Co., chairman of the dealers' committee; W. D. Anderson, of the Anderson Electric Car Co., chairman of the electric vehicle committee, and R. B. Spencer, of the Denby Motor Truck Co., chairman of the publicity committee. The program is to be arranged by the regular committees of the Motor Truck Club of America.

The tentative program divides the junta into three sections, the first day being manufacturers' day, the second, dealers' day and the third and fourth get-together days.

Wilson Co., Top Makers, To Build Trucks

DETROIT, MICH., Aug. 8.—A 11-2-ton truck will be placed on the market early in September by the C. J. Wilson Co., automobile tops and trimming manufacturers, located at Warren avenue and Fifteenth street, Detroit. The company, of which C. J. Wilson is president and general manager and Stanley C. Wilson, secretary-treasurer, has no connections with the C. R. Wilson Body Co., also of this city. G. Earl

Porter, formerly with the Admiral Motor Truck Co., is the designer of the new truck, and G. A. Freeman, formerly with the Warren Motor Co., has become purchasing agent.

Winton Motor Car Co. Is New Name

CLEVELAND, O., Aug. 10.—Papers have been filed with the Secretary of State changing the name of the Winton Motor Carriage Co., of Cleveland, O., to the Winton Motor Car Co.

New Moon Uses 1 Gallon Fuel Each 21 Miles

ST. LOUIS, MO., Aug. 7.—A trip of 678 miles in a Moon Four-38, in which one-half gallon of oil was used, was made this week by Chief Engineer Goodspeed of the Moon Motor Car Co., who made a trial run in the new model to Moline, Ill., from St. Louis and return. Goodspeed drove the car 172 miles in two days he was in Moline, showing its paces.

On the trip to Moline an average speed of 20 miles per hour was maintained and the gasoline mileage was 21 miles to the gallon of fuel.

Sparton Claims Horn Patent

JACKSON, MICH., Aug. 11.—Editor THE AUTOMOBILE—A case that has been pending in the patent office at Washington for some months in which the Lovell-McConnell Mfg. Co. has been trying to prove that it was the inventor of certain improvements in adjustability of motor-driven horns, has been decided against them. The patent was issued some time since to Wm. Sparks of the Sparks-Withington Co., and in passing on the matter the patent examiner stated that the Klaxon representatives were unable to prove that said Sparks was not the inventor.—Wm. Sparks, general manager Sparks-Withington Co.

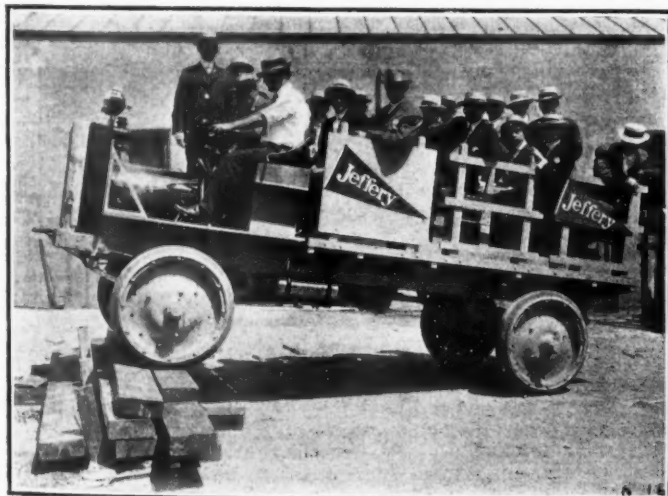
Savage Promoters Under Arrest for Fraud

DETROIT, MICH., Aug. 11.—The three chief promoters and officers of the Savage Motor Car Co., which was organized in Detroit last June, to manufacture a four-cylinder light car costing \$650, have been arrested by federal officers upon the charge of having used the U. S. mails to defraud. The three officers under arrest are president Delbert H. Cummings, secretary-treasurer-general manager R. W. Fishback and vice-president E. E. Taylor.

According to Detroit and Cincinnati post office inspectors, a large quantity of literature concerning the new Savage 20 car to be, was mailed out from Cincinnati and Chicago to every section of the country, for the purpose of inducing those who might become interested to secure the agency for the car. In order to get the Savage company's agency the customer was required to sign a contract for at least eight cars and make a deposit of \$25 per car as an advance payment and a guarantee of the good faith of the depositor. It is further claimed that the agency for certain counties was secured by the payment of \$100.

All told, it is claimed by post office inspectors E. E. Fraser of Detroit and Morgan Griswold and H. S. Smith, Cincinnati, that \$50,000 cash was thus received by the Savage Motor Car Co., and the arrested officials told the authorities that it was with the money thus received from the prospective dealers that they intended to start the manufacturing of their cars.

The local post office authorities will ask their superior officers in Washington to issue a fraud order against the Savage Motor Car Co., and have the offices on Lafayette avenue placed in charge of government officials.



Two stunts performed by Jeffery four-wheel drive Quad in test last week before a crowd of newspaper men

directors of the Buffalo Rubber Mfg. Co. was filed in federal court admitting the allegations charged against them by Elias Toy, of Philadelphia. They replied that the company is insolvent and they approved of the receivership.

The petitioner, president of the rubber company who filed the affidavit accompanying the petition, states that when the United States Light & Heating Co., of Niagara Falls, N. Y., recently went into hands of receivers, the Buffalo Rubber Mfg. Co. was unable to continue the manufacture of rubber because the receivers for the heating company cancelled a large quantity of orders. The complainant claims that the rubber company will be unable to manufacture and market its goods until the heating company again begins operations as usual.

Mr. Toy alleges that the company has numerous creditors in different states and cities. The petitioner's claim consists of \$350 for money loaned on a note. He alleges that the company has a floating debt of about \$9,000 and many individual claims and notes aggregating \$2,000, which are due and unpaid. In urging that a receiver be appointed Mr. Toy alleged that several suits had been brought against the company for collection of obligations and that other proceedings are threatened. The petition also maintains that the property of the defendant in this state is subject to judgment, execution and other proceedings, with the result that unless a receiver were appointed there would be a multiplicity of suits and complicated litigation. The assets of the company, Mr. Toy states, are greatly in excess of the liabilities and with proper care can be conserved and the business again placed on a firm basis.

Overland To Retire 250,000 Preferred Stock

TOLEDO, O., Aug. 10—The Willys-Overland Co., through its New York agent, the Bankers' Trust Co., has sent letters to all holders of Overland \$5,000,000 preferred, asking them to set prices on their stock. During the present month \$250,000 of preferred stock will be retired, in accordance with a provision of the company's charter.

"The redemption price of our preferred stock is \$110 a share," said Royal Scott of the Overland general offices. "The Bankers Trust Co. has been authorized to go into the market and procure the \$250,000 of stock that is to be retired. Stockholders will be given a chance to offer their stock at redemption price, or less. If a sufficient amount is not offered voluntarily, redemption of the required amount will be forced. The letters from stockholders will be opened August 25 or thereabout."

Half Rates for 1914 Licenses in California

TACOMA, WASH., Aug. 8—W. R. Ormsby, of the state motor vehicle department of California, has issued the following bulletin, effective Aug. 1:

"The attention of the public is called by the motor vehicle division to the fact that, beginning August 1 and terminating December 31, the fees for the registration of automobiles are one-half the regular fee. Also the fees for the registration as dealers in automobiles are one-half the regular fees.

"For the registration of motor vehicles, owned by or under the control of a manufacturer or dealer in motor vehicles, if such persons operate upon the public highways not more than five automobiles the revised fee is \$25, and \$5 for each automobile in excess of the five so operated."

Cleveland-Galion Wants To Declare Dividend

CLEVELAND, O., Aug. 10—The Cleveland-Galion Motor Truck Co. has asked authority to pay a second dividend of 15 per cent. to its creditors in a report filed in the Cuyahoga county court. This report also shows receipts and disbursements from April 23 to July 21. A hearing is scheduled for August 19.

Interstate Commission Allows Freight Raise

NEW YORK CITY, Aug. 10—Freight rates for the shipment of automobiles in the Great Lakes district are affected by the final publication of the decision of the Interstate Commerce Commission, allowing "a horizontal 5 per cent. increase in rates."

The increases apply only in the Central Freight Association territory, which lies between Buffalo and Chicago. Shipments to points east of Buffalo will not share in the advance, or through shipments to the Pacific. Part of the 5 per cent. will be allowed on freight for the South, however.

Taking the case of a freight rate which is 50 cents per 100 pounds, the net increase amounts to 5 per cent. which on first-class merchandise brings the figure to 52½ cents. Motor cars, however, are classed at 110 per cent. of first class rates, which brings the figure to 57½ cents per 100 pounds.

Fifty Miles of Wider Roads Built in Massachusetts in 1914

Whole Mileage of State Is Now 980.37, the
Additions Having Lower Crown and
Bituminous Binder

BOSTON, MASS., Aug. 8—The annual report of the Massachusetts Highway Commission has been issued containing the facts relative to roads and motor vehicles which interest road builders and motorists. According to it the total length of state highways now completed is 980.37 miles, of which a mileage of about 49.5 was done last year.

There has been expended on these roads since the work was first undertaken just \$9,288,143.35. This does not include the money spent by towns and cities.

The report states that for the past 3 years there has been a constant increasing interest on the part of city and town officials to secure good roads, and the commission has extended a great deal of aid to such officials. County officers also have done their share to increase the state mileage.

About \$2,690,000 was available for maintenance and constructive work last year and out of this much was accomplished in the way of resurfacing highways, strengthening bridges, etc.

The commission feels that it needs more men for its engineering department for it states, "To increase from \$650,000 to more than \$3,000,000 for road expenditures in five years, without a corresponding increase in the working force, and to secure good results are certainly worthy achievements for any office or any force."

Building Wider Roads

The commission has continued its policy of making the main roads wider, usually building 18 feet of stone surface instead of 15 feet, which was formerly the standard width. It has also continued to use on such roads some bituminous binder and has been reducing the crown of the road 1 inch to the yard in width, not only to make the road less slippery, but also in order that the traffic will distribute itself over the whole width of the highway. This additional width and bituminous binder which is now necessary increase the cost of construction from 50 to 75 per cent. The 8-hour law and the workmen's compensation law have also largely increased the cost. The increase in traffic, particularly of motor trucks, is responsible for the increased width and cost of the highways now.

The commission has started experimental work on a sand and clay road in Gay Head under the direction of an engineer from Washington, and if it is found that it will stand up in Winter many more miles will be constructed on the South Shore where there is an abundance of material, and because of the low cost of such highways.

The commission has done work in 222 cities and towns and \$287,000 was available for this work. The report states that what were formerly country roads have now become main highways because of the adoption of motor vehicles for business and pleasure and this has been the cause of a big expense for maintenance. Some of the state highways are 20 years old but the average of all is about 10 years. While adequate for some years after they were constructed they are too narrow now in some places, and are wearing out badly in others. It will cost from \$8,000 to \$10,000 a mile for reconstruction, but the work must be planned far ahead, and be done gradually or in a few years many miles of state highway on the heavily traveled routes will give out and go to pieces. The work should be planned and at least 100 miles a year done from now on so that at the end of 5 years at least 500 miles will be widened and reconstructed. The engineers estimate that at least \$3,000,000 is needed for the immediate widening and reconstruction of the through routes.

Some system of uniform traffic counts should be adopted from a formula that would give the weight or damage done by the different kinds of traffic, based on the weight per yard width per year, or per day, so that results may be compared, according to the report.

Some of the facts connected with the automobile department are very interesting. It shows that out of 5,847 persons examined to drive motor vehicles 671 failed. In 1912 of 5,936 examined 347 failed showing that the examiners are more strict apparently, for almost all the failures were on the road test in handling vehicles.

Mulford at Elgin with Peugeot—Entries Now 19

Next Week's Big Road Race Will See the First Constellation of American Stars in Competition—De Palma Arrives from Europe with Grand Prix Mercedes

CHICAGO, Aug. 10—Ralph Mulford with a third Peugeot, the one in which he cleaned up at Galveston and which also was Boillot's mount in the last 500-mile race at Indianapolis, is the nineteenth entrant in the Elgin road races which are booked for August 21-22. The entry is made by the Peugeot Import Co. of New York. Prior to the recording of the Mulford entry Frank Fox nominated the Gray Fox with Howard Wilcox as pilot.

Entries to Elgin close next Saturday but even if no more come in before then, the Chicago Automobile Club already has a field that surpasses anything ever before secured for the Kane county classics. In the way of drivers it has such celebrities as Ralph de Palma, Bob Burman, Barney Oldfield, Spencer Wishart, Ed Pullen, Gil Anderson, Ralph Mulford, Ed Rickenbacher, Harry Grant and Howard Wilcox, while in the way of cars there are three Peugeots, three Stutzes, three Mercers, two Marmons, two Duesenbergs, two Sunbeams, a Mercedes, a Braender Bulldog, Pahys and the Gray Fox. When Moross names the Maxwells with Tetzlaff, Hughes and Carlson, then the list will round out well. It looks as if twenty-five cars would start each day.

Already the drivers are hurrying to Elgin and informal practice now is going on. The Sunbeams, Duesenbergs, This, Marmons and the Dearborn Stutz already are there.

Poor Track, Slow Races at Worcester

WORCESTER, MASS., Aug. 8—The International Racing Club came to the Greendale track to-day and staged a series of races that brought out about 300 people, an attendance that was very disappointing to the promoters of the meet. As no arrangements had been made to put the track in shape, and it was so dusty that even with two cars going at once it was dangerous, the big event of the day, the 25-mile event, was called off because the drivers were afraid to risk their lives. So instead the program was lengthened out into one, two and three-mile events with the same cars. When the races were all over Jack Laviolette had captured five events, Pete Bourque three, Burlingame two and Weldon and Reynolds one each. The summary:

Two miles—Won by Laviolette, Mercer; Weldon, Lozier, second. Time 2:44.

Two miles—Won by Bourque, National; Reynolds, Knox, second. Time 2:40.

Two miles—Won by Weldon, Lozier; Burlingame, Knox, second. Time 2:39.

One mile speed trial—Laviolette, Mercer, 1:17 1/4; Bourque, National, 1:17 1/2; Reynolds, Knox, 1:32.

Three miles—Won by Burlingame, Knox; Reynolds, Knox, second. Time 4:31.

Two miles—Won by Laviolette, Mercer; Bourque, National, second. Time 2:38.

One mile—Won by Laviolette, Mercer; Bourque, National, second; Weldon, Lozier, third. Time 1:15.

One mile—Won by Bourque, National; Reynolds, Knox, second. Time 1:28.

Two miles—Won by Bourque, National; Weldon, Lozier, second. Time 3:00.

One mile handicap—Won by Laviolette, Mercer; Reynolds, Knox, second. Time 1:18.

Two miles—Won by Burlingame, Knox; Reynolds, Knox, second. Time 2:55.

Three miles—Won by Reynolds, Knox. No time taken.

Lorraine-Dietrich Wins Touring Car Race

PARIS, July 29—Angers has held a 231-mile road race for touring cars only, in which the winner was François Sisz, who drove a Lorraine-Dietrich at an average of 65.6 miles an hour. Although the winning machine carried four passengers and had the touring equipment required under the rules, it is only fair to state that it began life as a pure racer and even took part in one of the French Grand Prix races.

In contrast to the winner, which was a racer disguised as a touring car, there were about a score of others which had genuine touring car chassis equipped as much like racers as the rules would allow.

The Lorraine-Dietrich, which has a piston displacement of about 670 cubic inches, was followed home by a Hispano-Suiza of only 183 cubic inches at an average speed of 58 miles an hour, this being maintained over a course of a difficult, winding nature. Arthur Duray, on a Turcat-Mery, came third a little more than a minute behind the Hispano-Suiza. Fourth place went to a Cottin-Desgouttes, and fifth and sixth places to Chenard-Walcker cars of 3.5 by 5.9 inches bore and stroke. The faster of these two cars averaged a little more than 57 miles an hour.

An interesting performance was that of a little Gregoire of only 2.7 by 5.5 inches bore and stroke which won tenth place at an average of nearly 52 miles an hour. This was a stock car driven by Bignan, the designer of the motor, and was put in at the last moment when the car originally entered had to be withdrawn owing to an accident.

The following is the summary of the race:

CAR	DRIVER	TIME
Lorraine-Dietrich	Sisz	3 31 06
Hispano-Suiza	Antoine	3 58 57
Turcat-Mery	Duray	3 59 39
Cottin-Desgouttes	De Franck	4 00 19
Chenard-Walcker	Glaszmann	4 04 41
Chenard-Walcker	Dauvergne	4 10 51
Aquila-Italiana	Leduc	4 10 52
Nazzaro	Baratteau	4 26 01
Hispano-Suiza	Bara	4 27 06
Gregoire	Bignan	4 37 49
Rolland-Pilain	Sire	4 56 15
Scap	Molet	4 59 54

Brighton Beach Preparing for Labor Day Races

NEW YORK CITY, Aug. 10—Rapid progress is being made with the preparations for the race meet at Brighton Beach on Labor Day. This will be the first speed carnival offered to New Yorkers this year.

It is expected that many of the contenders at Galveston beach and Elgin will be among the starters.

The star event will be a 100-mile race for a \$1,000 purse, \$500 to the first, \$300 to the second, \$150 to the third and \$50 to the fourth.

Columbus Race Sanction To Sloan Protested

COLUMBUS, O., Aug. 10—The Columbus Automobile Club and the Columbus Auto Trades Association, which combine both the owners and dealers of the city, have protested to the A. A. A. against the granting of a sanction to J. Alex. Sloan, of St. Paul, to hold a two days' race meeting on the track of the Columbus Driving Association August 15 and 16. The sanction had been granted previous to the energetic protest of the local organizations.

Strong pressure is being brought to bear on the A. A. A. to withdraw the sanction. If it is not withdrawn the Columbus Automobile Club and probably the Ohio Automobile Association will withdraw from the A. A. A.

It is claimed that the Columbus track is unsafe for fast racing, which is shown by the records of the 200-mile race in 1913 when two men lost their lives.

Race Celebrities for Minnesota State Fair

MINNEAPOLIS, MINN., Aug. 10—Several well-known race track stars have been retained for automobile days at the Minnesota State Fair, September 7-14. The races will be on the Hamline one-mile dirt track September 12. Prizes aggregate \$1,500. Among the entries are Louis Disbrow, Barney Oldfield, Eddie Rickenbacher, Bill Knipper, Johnnie Raimy, Eddie Hearne, Fred Horey and Joe Cleary.

NEW YORK CITY, Aug. 7—In the recent races at Galveston, in which Mulford took ten out of the sixteen events, Rajah spark plugs, made by the Rajah Auto Supply Co., Bloomfield, N. J., were used. One set of plugs lasted the whole meet. It is stated that no attention whatever was given to this part of the equipment.

Durant Vice-President of Monroe Co.

FLINT, MICH., Aug. 7—The election of officers of the Monroe Motor Co., which was organized last week, has taken place. R. F. Monroe is president and general manager; W. C. Durant, vice-president; A. G. Bishop, treasurer; Curtis R. Hathaway, secretary; W. C. Rowles, R. F. Armstrong and A. B. C. Hardy, together with the officers, make up the board of directors.

Factory Miscellany

FORD Enlarges in Canada—A \$300,000 addition to the Ford Motor Co.'s plant at Ford City, Ont., will be erected at once, the new section to replace the only remaining old buildings now known as the "old wagon works." The new building will be six stories high and 200 feet square. It will be of reinforced concrete, of the same design as the main building of the plant.

Between 400 and 500 new men will be employed when it is completed, and the floor space of the plant will be increased nearly 50 per cent. The company is at present building assembling factories in Toronto and this city and will start another in London, Ont., before the fall. These plants will have a capacity of 25 cars a day each, and the Ford City plant will supply them with finished parts.

Michigan Brass Plant Moved—The Michigan Brass & Foundry Co., which was purchased recently by capitalists of Battle Creek, Mich., is being moved to the latter city.

1,000 Engers Next Year—President F. C. Enger of the Enger Carriage Co., Cincinnati, O., has been in Detroit for some time for the purpose of getting the necessary material for the building of 1,000 Enger cars for next year.

Equipping Billings & Spencer Plant—The plant of the Columbia Motor Car Co., recently acquired by the Billings & Spencer Co., Hartford, Conn., is being put in order. The first lot of equipment was moved into the building about the first of August.

Argo Executive Offices in Jackson—The New York City office of the Argo Motor Co., Inc., at 7 East Forty-second street will be discontinued August 1. On and after that date the executive offices of the company will be at Jackson, Mich., where the factory is located.

A. O. Smith Co. Has Outing—The 3,000 employees of the A. O. Smith Co., Milwaukee, pressed steel frames and parts, participated in a monster outing with their families at Waukesha Beach on Saturday, August 8. More than 11,000 persons were on the grounds.

Gramm - Bernstein Expanding—The Gramm-Bernstein Manufacturing Co., of Lima, O., maker of motor trucks, will soon start the erection of a large addition to its factory. B. A. Gramm, general manager, says the work will be rushed to completion some time in September.

Ford Building in Cleveland—The contract for the branch factory building for the Ford Motor Co., Detroit, which is located on East 117th street, Cleveland, has been awarded to Morrow Bros., Baltimore, Md. The structure will be 157 by 296 feet and four stories in height. It will be of brick, steel and concrete construction.

Fisher Body to Enlarge—To provide for increasing business, the Fisher Body Company, Detroit, has acquired a five-story building with 100,000 sq. ft. of floor space at Forest and Grandy avenues, for use as an additional unit to its present plants. It is being equipped for automobile body production.

Patent Farm Tractor—Curry and Richmond Dort, two young men living at Westerville, O., have secured patents on a motor driven tractor which they claim will revolutionize farm work. The machine is in the form of a light motor-driven farm tractor embodying different devices which will adapt it to pumping water, grinding feed, cutting wood, churning and other farm work.

Packard Patrols Go 80,188 Miles—The nine Packard automobile patrols which the police department of the city of Detroit is using covered a total of 80,188

miles during the year ending June 24, 1914. The average mileage per patrol was 8,909 miles, while the average daily mileage per vehicle was 24.4 miles. A total of 50,613 runs were made during the year, or an average of 5,623 per car, or over fifteen per day per car.

Ford Increases Minneapolis Plant—The Ford Motor Co. has bought two lots for an addition to its ten-story building at Fifth avenue, N. and Fifth street, which is not yet completed. The additional space gives the company an entire square of land and will enable it to double the size of its \$750,000 assembling plant. The lots cost \$37,950. For the present the land will be utilized for a side track and to run cars upon.

Mitchell Six Fire Fighter—The Mitchell-Lewis Motor Co., Racine, Wis., last week made delivery of a new type of fire chief's car to the city of El Paso, Tex. The car is built on the Mitchell De Luxe Six chassis as a roadster, and has room for three passengers. Chemical extinguishers, lanterns, ropes and other pieces of small equipment for fire-fighting are ingeniously arranged in and around the car, which is a small fire department in itself and capable of 70 miles per hour with its 4½ by 7 inch six-cylinder motor.

Automobile Works for New Orleans—Capitalized at \$1,000,000, the Southern Automobile & Supply Co. has been organized to establish automobile works at New Orleans. It plans the construction of seven buildings to cover five acres and the installation of machinery to manufacture every part of an automobile, for constructing motor-boats and gasoline engines, etc. The buildings are to be fireproof, and construction bids will be opened about November 15, while the machinery proposals will be opened about December 1.

The Automobile Calendar

Aug. 2-9.....Grenoble, Automobile Club of France's 6-Day Motorcycle and Cyclecar Reliability Contest in French Alps.	Sept. 6-7-8.....Newark, N. J., Cyclecar Reliability Tour to Atlantic City.	Oct. 16-26.....Paris, France, Automobile Salon.
Aug. 16.....Le Mans, France, Automobile Club de la Sarthe's Coupé International Light-Car Race, 1 liter, 400 maximum cylinder area, 350-500 kilos weight.	Sept. 7-14.....Indianapolis, Ind., Automobile Show, Indianapolis Automobile Trade Assn.	Oct. 17-24.....Pittsburgh, Pa., Automobile Show, Auto Dealers Assn., Inc.
Aug. 17.....Le Mans, France, Auto Club de la Sarthe's Grand Prize de France for 4½ liter cars.	Sept. 9.....Corona, Cal., Road Race, Corona Auto Assn.	Oct. 19, 20, 21.....Philadelphia, Pa., Elec. Veh. Assn.'s Convention.
Aug. 21-22.....Chicago, Ill., Elgin Road Races, Chicago Automobile Club.	Sept. 9-11.....Convention Paving Brick Mfrs. Assn., Cleveland, O.	Oct. 19-26.....Atlanta, Ga., American Road Congress of the American Highway Assn. and the A. A. A.
Aug. 23.....Auvergne, France, Coupé de l'Auto Race.	Sept. 10.....Portsmouth, Eng., Autumn Conference, Institute of Metals.	Oct. 28-31.....Milwaukee, Wis., Convention, Northwestern Road Congress, Auditorium.
Aug. 27.....Brooklands Track, England; Annual Automobile Race.	Sept. 10-15.....Berlin, Germany, German 4½-liter race.	Nov.....El Paso, Tex., Phoenix Road Race, El Paso Auto Club.
Aug.....Denver, Colo., 650-mile Run, Colorado Springs to Salt Lake City.	Sept. 15-Oct. 11.....New York City, Commercial Tercentenary Celebration.	Nov. 6-14.....London, England; Olympia Show.
Aug.....Russia, Road Race, Coupe de l'Empereur, 2,500 miles.	Sept. 26.....Brooklands Track, England, Annual Automobile Race.	Nov. 8-9.....El Paso to Phoenix, Ariz., Automobile Race.
Sept. 6-7.....Brescia, Italy, Auto Club of Italy's 4½-liter Grand Prize.	Sept. 26-Oct. 6.....Berlin, Germany, Automobile Show.	Nov. 8-11.....Shreveport, La., Track Meet, Shreveport Auto Club.
	Oct.....Philadelphia, Pa., E. V. A. A. Annual Convention.	Nov. 15.....Paris, France, Kerosene Motor Competition.
	Oct. 4.....St. Louis, Mo., Automobile Show, Auto Manufacturers' and Dealers' Assn.	Jan. 2-9.....New York City, Annual Automobile Show, Grand Central Palace.
	Oct. 7-17.....New York City Electric Vehicle Show, Grand Central Palace.	Jan. 9-16.....Philadelphia Automobile Show.
	Oct. 9-Nov. 2.....S. A. E. European Trip.	Jan. 23-30.....Chicago, Ill., Automobile Show, First Regiment Armory.

The Week in the Industry



Motor Men in New Roles

Hogle Leaves Alma—W. M. Hogle has resigned as general sales manager of the Alma Motor Truck Co., Alma, Mich.

Stanley Takes Lewis in Milwaukee—The Stanley Steamer Co., 321 Fourth street, has taken the agency for Lewis cars.

Winter Wizard Electric Representative—The Wizard Electric Lamp Co., San Francisco, Cal., has appointed H. L. Winter its Detroit sales representative.

Overland Has Boston Outing—The annual outing of the men handling Overland cars under the direction of Connell & McKone, of Boston, was held recently near Boston.

Fields Chalmers Assistant Sales Manager—The Chalmers Motor Co. has appointed Jos. Fields, formerly of Fargo, N. D., assistant sales manager, of its Detroit plant.

Gaither Takes Wahl Agency—The Gaither Auto Company, 241 North Fourth street, Columbus, O., has taken the distributing agency for the Wahl in the entire state of Ohio for 1915.

Die Shop in Milwaukee—Edward A. Kickhaefer, of Milwaukee, has organized the Kickhaefer Mfg. Co. and established a shop for the production of dies and stampings at 199-201 Clinton street.

La Fournier Changes—Jack La Fournier, formerly connected with the Vulcan Mfg. Co., will manage a new garage and repair shop, being erected at the corner of State and Erie streets, Painesville, O.

A. T. Mosher Goes to Chalmers—A. T. Mosher, formerly head of the wholesale department of the Nordyke & Marmon Co., has become state representative for the Chalmers Auto Co., distributors in Indiana for the Chalmers and Peerless.

Paige-Detroit Agency in Nyack—The Rockland County Sales Co. has been organized in Nyack, N. Y., to act as Rockland county distributors of the Paige-Detroit. W. C. Beattie, formerly with the Sprague Electric Works, will assume active charge.

Horne Transferred—Charles W. Horne, who traveled in the middle western states for the Gibson Auto Co., has been transferred to Birmingham, Ala. R. M. Beck, who traveled for the same company in Southern territory, has been transferred to southern Illinois.

Girard Wins Promotion—Frank J. Girard, who has been in charge of the Peerless branch at Columbus, Ohio, located at 168 North Fourth street, has been appointed district manager for the Peerless and will make his headquarters in Columbus. He will have all of central and southern Ohio in his territory. A service station with all parts will be maintained at 111 East Lynn street, with R. L. Gardner in charge.

Morse on World Trip—A business trip around the world to investigate the automobile business and its requirements from the American point of view and to look after the business done by its various agents and representatives in foreign

countries, is the program mapped out by E. C. Morse, sales manager of the Hudson Motor Car Co., Detroit, who sails this week for South America, and then will go to the other big countries in Asia, Australia, Africa and Europe.

Garage and Dealers' Field

M. & F. Sales Absorbs Consumers—The Consumers Tire Co. has been bought out by the M. & F. Sales Co., which has removed from 422 Jefferson street to 701 Wells street. E. N. Ircink, formerly with the Aermore Mfg. Co., Chicago, has become sales manager.

Goodrich Has Toronto Store—The B. F. Goodrich Co., of Akron, O., will be represented in Canada henceforth, for the Diamond Tire brand, by the J. F. Holden Rubber Co., 699 Yonge street, Toronto, which has handled Morgan & Wright and Dominion tires for years.

Electric Tool Co. in Milwaukee—The International Electric Tool Co. has been organized here, Wm. R. Sorgel being president; Wm. H. Gaulke, vice-president and secretary, and E. K. Rundle, treasurer. The concern will make a line of electrical tools for garages, machine shops, foundries.

Brillion Garage Transferred—The Calumet Garage Co., Brillion, Wis., has been purchased by Edward Colvar, of Manitowoc, Wis., and Adolph Valesky, of Collins, Wis., who will continue the business under the style of Brillion Garage. The concern will distribute the Overland in this territory.

Ohio Making Roads—The Ohio Highway Commission on August 4 awarded road improvement contracts in the Buckeye State amounting to \$2,629,000, which call for the construction of 178 miles of highways in almost every county of the state. A large part of the work is to be done during the present season.

Modern Garage in Menominee—The Dugas Motor Co., of Menominee, Mich., has purchased a site and will proceed immediately with the erection of a \$20,000 garage building at 315 Ogden avenue. It will be a two-story, of liberal dimensions and contain a large repair shop, equipment for which is now being purchased.

Dodge Agent in Connecticut—The Hartford Motor Car Co. is in the process of organization for the purpose of representing the Dodge Bros. car in Hartford, Tolland and Middlesex counties. Charles E. Walker, F. M. Ridler and Ralph A. Barkman, who have been connected with the Pope Mfg. Co., are prime movers in the project.

Big Accessory Store in Superior—The Motorcraft Store, 1716 Broadway, Superior, Wis., is the name of a new establishment opened Aug. 1 by A. C. Eveland & Co. The store carries the largest stock of motor car and cycle accessories, tires, etc., in the northwest. Mr. Eveland formerly was associated with the Kelly Hardware Co., of Duluth, Minn.

Remy Increases Service Stations—The Remy Electric Company, of Anderson, Ind., recently opened new service stations with D. F. Holliday & Co., 344 N. Delaware street, Indianapolis, Ind.; Perry-Mann Electric Co., Columbia, S. C., and Washington Auto Supply Co., Seattle, Wash. In each of these service stations a skilled mechanic is stationed with a full line of parts for Remy equipment.

To Auction Used Cars—Monthly auction sales of used cars are to be held by the Claypool Hotel Garage Co., Indianapolis, the first sale having begun August 8. The monthly sales will continue two or three days. The company is buying used cars throughout Indiana and adjacent states and announces that it will buy only cars that are in good running order. The company plans to provide an outlet for dealers and manufacturers for used cars.

Minneapolis Overland Dealer Building—Bowman & Libby, Inc., distributor for the Overland cars, are in possession of a block of ground on Great Northern trackage which will become the site of a huge warehouse to carry at least 1,500 cars. The building will be three stories, mill construction, with sprinklers. With a double-deck arrangement it will be practically a six-story building. Three hundred feet of railroad trackage will enable the firm to unload seven freight cars at a time. The building will cost \$75,000 and will be ready Dec. 1. The firm will concentrate its storage, now in three warehouses, for winter distribution of machines. The building is to be of brick and terra cotta exterior, 100 by 300 feet.

Canadian Cyclecar Ready—The first Canadian company to make an announcement of a completed vehicle is the Welker-Doerr Company, of Berlin, Ont. The machine is a true cyclecar termed the Wel Doer and seats its two passengers side by side with the driver at the right. The wheel base is 100 inches, the tread 36 inches and the weight 500 pounds. The motor is a two-cylinder, air-cooled unit, rated at 9-13 horsepower. Ignition is by Berling dual magneto. Transmission is by friction, with final drive by belt. The frame is of reinforced white ash, on quarter-elliptics.

Baby Rex Made in Edmonton—The first to be manufactured in Edmonton will be the Baby Rex. A company, the directors of which are P. S. Osser, managing director; Charles J. MacMillan, manager, and A. A. Howard, director and secretary-treasurer, has secured incorporation under the name of Rex Motors of Canada, Limited. It is the intention of the company to establish their plant in Norwood. The car they will build is designed on decidedly unique lines, and it has many points of distinction for a light weight car. The engine is of the aeroplane type. It has sixteen horsepower and will develop a speed of from six to sixty miles an hour and in ordinary running will make 45 miles on a gallon of gasoline. There is nothing in the car to freeze, the engine being air-cooled. Its weight is 750 pounds. It is equipped with self starter and wire wheels.

Recent Incorporations in the Automobile Field

AUTOMOBILES AND PARTS

Delaware

DOVER—The Lighthouse Tire Co.; capital, \$1,000,000; to manufacture, sell and buy motor cars, tires and accessories.

WILMINGTON—Pittsburgh Motor Car Co.; capital \$100,000; to manufacture motor cars and all kinds of motors. Incorporators: J. M. Frere, H. J. Davis and G. Shearer.

Illinois

CHICAGO—Lincoln Motor League; capital, \$2,500; to manufacture, repair and deal in motor cars. Incorporators: A. H. Maurer, C. E. Hall and W. A. McGivern.

Indiana

FT. WAYNE—Ft. Wayne Overland Auto Co.; capital, \$5,000; to deal in motor cars. Incorporators: James S. Walsh, Thomas F. Gaskins and George H. Zehender.

Massachusetts

BOSTON—Chalmers Motor Co. of Massachusetts; capital, \$100,000; to deal in motor cars. Incorporators: J. J. Murray, Boston; J. L. Hermonson, Brookline; and others.

BOSTON—Mohawk Motor Car Co.; capital, \$40,000; to deal in motor cars. Incorporators: C. E. Bosworth, Whitman; H. E. Fullam, Lynn; and others.

Michigan

DETROIT—The Western Gear Mfg. Co.; capital, \$5,000; to manufacture gears and other motor car parts. Incorporators: John Saunson, Oscar Palm and Victor Palm.

KALAMAZOO—Safety Fire Motor Car Co.; capital, \$10,000.

Minnesota

DULUTH—East Wheel Auto Co.; capital, \$100,000. Incorporators: N. J. Upham, T. F. Upham and others.

New York

BROOKLYN—Fred S. Phinney; capital, \$5,000; to manufacture cars and accessories, etc. Incorporators: F. S. Phinney, 100 Madison St., Brooklyn; A. N. Phinney, Brooklyn; A. S. Phinney, New York.

BUFFALO—Hudson-Oliver Motor Co.; capital, \$15,000; to deal in motor cars and car supplies. Incorporators: E. G. Oliver, George B. Wesley and Charles W. Pooley, all of Buffalo.

BROOKLYN—Casson Garage, Inc.; capital, \$3,000. Incorporators: Patrick H. Mulrear, 28 Kosciusko St.; Edw. H. Mulrear and Albert W. Mulrear, both of 862 Bedford Ave., all of Brooklyn, N. Y.

BROOKLYN—Cooper Flexible Transmission Co., Inc.; capital, \$100,000; to manufacture transmission appliances for cars, etc. Incorporators: Ben C. Holt, 50 Church St., New York, N. Y.; Minnie Howe and Sidney C. Yeemans, both of 221 Borden Ave., Long Island City, N. Y.

BROOKLYN—Fred S. Phinney, Inc.; capital, \$5,000; motor car accessories, etc. Incorporators: Arthur S. Phinney, 108 West 45th St., New York, N. Y.; Fred S. Phinney and A. N. Phinney, both of 190 Madison St., Brooklyn, N. Y.

BROOKLYN—Krugger Bros. & Co., Inc.; capital, \$4,000; to repair cars, etc. Incorporators: John Krugger, 209 12th St.; Jas. C. Krugger, 365 56th St., and Jos. Krugger, 254 Prospect Ave., all of Brooklyn, N. Y.

BUFFALO—Melnhard Auto Service Specialties Sundries Supply Co. Incorporators: C. J. Staples, C. H. and T. P. Melnhard, all of Buffalo.

BUFFALO—W. & L. Mfg. Co.; capital, \$30,000; to repair motor cars. Incorporators: H. Z. White, 183 West Tupper St.; B. O. Lee and P. W. Lee, all of Buffalo.

HEMPSTEAD—Baker Rim & Auto Supply Co.; capital, \$5,000; to conduct a sales agency. Incorporators: H. L. and G. H. Bankney and O. J. Ipsen, both of Garden City, and others.

NEW YORK—Garrett Auto Service Co.; capital, \$10,000. Incorporators: H. G. Commons, 210 West 78th St.; R. D. Whiting and W. G. Stahlnecker, all of New York City.

NEW YORK—J. Dolton & Co., Inc.; capital, \$900; to repair and store cars. Incorporators: Jack Dolton, Jos. C. Dolton and Wm. N. Flein, all of 354 West 50th St., New York, N. Y.

NEW YORK—Lighthouse Tire Co., Inc.; capital, \$5,000; to manufacture and deal in rubber tires for motor cars, etc. Incorporators: John McLaren, F. B. Knowlton and S. V. Dowling, all of 154 Nassau St., New York, N. Y.

NEW YORK—Otto Gutzmann, Inc.; capital, \$12,000. Incorporators: Otto R. Gutzmann and Paula Gutzmann, both of 911 Amsterdam Ave., New York, N. Y., and Martin Beickert, 1876 Broadway, New York, N. Y.

NEW YORK—Riebe Ball Bearing Co., Inc.; capital, \$20,000; to manufacture ball bearings and car accessories. Incorporators: Jos. Hever, 77 Essex St., Hackensack, N. J.; Emil M. Lowy and Leo L. Lowy, both of 920 Prospect Ave., New York, N. Y.

NEW YORK—S. S. Garage Co., Inc.; capital, \$5,000. Incorporators: Chas. G. Evans, 233 Broadway; John F. Staiber and Harry B. Stowell, both of 153 West 54th St., all of New York, N. Y.

NEW YORK—Unedea Tire Filler Co.; capital, \$100,000; to manufacture and deal in motor car accessories. Incorporators: M. E. Rosenthal, New York; J. Golden, Brooklyn; T. Bilga, New York.

SARANAC LAKE—Shelley Tool Co.; capital, \$10,000; to deal in motor cars, motorcycles, machinery, etc. Incorporators: Nathan M. John H. and Hattie B. Shelley, all of Saranac Lake.

Ohio

CINCINNATI—Cincinnati Speedway Co.; capital, \$10,000; to build and operate a motor speedway. Incorporators: W. T. Foley, F. D. Hirst, T. A. Tauwold, Jr., G. A. Ginter and A. H. Morrill.

CLEVELAND—Windemere-Euclid Garage Co.; capital, \$10,000. Incorporators: Carl R. Baker, C. F. Taplin, Earl H. Wells, V. M. Harris and E. M. Golding.

CLEVELAND—Fenfar Co.; capital, \$10,000; motor car parts. Incorporators: E. W. Farr, C. W. Fenner, F. J. Breeler, Otto Gutzmann, W. E. Ward and C. A. Ebert.

CLEVELAND—The Hudson-Stuyvesant Motor Co.; capital, \$25,000; to manufacture motor cars and supplies. Incorporators: F. E. Stuyvesant, Richard L. Kreesen, B. J. Guthery, R. E. Williams and H. M. Hodot.

CLEVELAND—Simplex Distributing Co.; capital, \$10,000; to sell motor cars. Incorporators: F. S. McGowan, E. A. Foote, A. R. Manning, Jr., S. Chestnutt and M. N. Job.

PORTSMOUTH—Motor Fuel & Lubricating Co.; capital, \$5,000; to deal in motor cars, accessories and supplies.

Washington

SEATTLE—Auto Specialty Co.; capital, \$10,000. Incorporators: J. P. Hill, H. M. Kerr and L. Frank Brown.

Wisconsin

MADISON—Star Tire & Rubber Co.; capital, \$5,000; to manufacture and deal in tires and rubber goods. Incorporators: J. W. Mort, C. E. Mort and M. M. Mort.

NEW YORK—Whitefield Motor Car Co., Inc.; capital, \$175,000. Incorporators: Morgan J. O'Brien, 2 Rector St.; Alan J. Corey, 91 William St., and Dewees Dilworth, 140 Broadway, all of New York, N. Y.

Virginia

RICHMOND—Overland Motor Co.; capital, \$5,000 to \$20,000; to deal in motor cars. Incorporators: D. P. Browder, O. C. Granger and others, all of Richmond.

GARAGES AND ACCESSORIES

California

LOS ANGELES—The Over-All Roller-Bearing Co.; capital, \$500,000. Incorporators: T. W. Starr and others.

Delaware

WILMINGTON—Day Tire Protector Co.; capital, \$100,000; to manufacture motor car tires. Incorporators: F. K. Hansell, Philadelphia, Pa.; G. H. B. Martin and E. T. Vennel, both of Camden, N. J.

WILMINGTON—Mogul Starter Co.; capital, \$100,000; to manufacture and deal in starting devices for internal combustion engines, etc. Incorporators: W. H. Harris, E. J. Enlers and J. F. Southard, all of Chicago, Ill.

Illinois

CHICAGO—Chicago Gear Co.; from \$10,000 to \$30,000.

ST. LOUIS, Mo.—George C. Brinkman Motor Car Co.; from \$15,000 to \$50,000.

Michigan

DETROIT—Central Oil Co.; capital, \$200,000; to deal in gasoline. Incorporators: Roy F. Francis, Otto C. Zoller, Robert J. Morrison and Edward C. Hoffman.

DETROIT—Detroit Starter Co.; capital, \$20,000; to manufacture motor car starters and other devices. Incorporators: Alonzo B. Porter, John W. Fitzgerald and F. Joseph Lamb.

DETROIT—General Garage Co.; capital, \$5,000. Incorporators: J. Frank and Florence D. Boydell, John C. and Bessie N. B. Wood.

DETROIT—Home Service Co.; capital, \$1,200; to deal in motor car supplies. Incorporators: Roland C. Simon, Lorenz Diebel and James E. Dale.

DETROIT—Spranger Rim & Wheel Co.; capital \$100,000; to manufacture motor car wheels and rims. Incorporators: N. M. Spranger, Frank Spranger and Clara B. Dettmer.

DETROIT—Western Gear Mfg. Co.; capital, \$5,000; to manufacture gears and other motor car parts. Incorporators: John Saunson, Oscar Palm and Victor Palm.

Missouri

KANSAS CITY—Auto Jack & Storage Co.; capital, \$25,000. Incorporators: Robert Parker, L. H. Parish and R. E. Stucker.

New Jersey

NEWARK—New Jersey Motor Utilities Co.; capital, \$50,000. Incorporators: John McLean, F. B. Knowlton, I. O. Dowling, all of New York, N. Y.

Automobile Agencies Recently Established

PASSENGER CARS

Arizona

Phoenix.....Jeffery.....McArthur Brothers

California

Los Angeles.....Car-Nation.....Herbert T. Brown
San Francisco.....Hupmobile.....Linz-Sanborn Motor Co.

Canada

Montreal.....Moon.....Savigny & LaLonde
Toronto, Ont.....Pullman.....R. C. Todd, Todd's Gar.

Connecticut

Hartford.....Herff-Brooks.....E. H. Harris
Hartford.....Stearns.....The Britton Co.
Mystic.....Franklin.....Mystic Auto Station

Idaho

Orofino.....Detroit.....W. T. Bennell

Indiana

South Bend.....Overland.....Overland-South Bend Co.

Iowa

Des Moines.....Franklin.....Johnston Motors Co.

Massachusetts

Boston.....Lozier.....Leghorn Motor Car Co.
Worcester.....Pullman.....Peter Welin

Michigan

Kalamazoo.....Studebaker.....L. E. Kraft

Missouri

St. Louis.....Stutz.....Stutz Automobile Co.

North Carolina

Charlotte.....Pullman.....Auto Sales Co., Inc

New Hampshire

Dover.....Pullman.....Granite State Garage
Manchester.....Pullman.....H. L. Lamprey

New York

New York.....Lexington.....Partridge, Clark & Kerrigan, Inc.

Ohio

Cleveland.....Maxwell.....W. H. Barger Co.
Columbus.....Empire.....S. W. Schott
Columbus.....Hudson.....The Standard Motor Car Co.
Newark.....Saxon.....Warren S. Weiant, Jr.
Toledo.....Mitchell.....H. E. Throne

Oregon

Portland.....Jeffery.....Frank C. Riggs

Pennsylvania

Eric.....Pullman.....Eric Penn Auto Co.

Rhode Island

Providence.....Hudson.....R. W. Powers
Providence.....Paige.....
Detroit.....J. C. Tucker Co.

Tennessee

Memphis.....Buick.....The H. A. White Auto Co.

Washington

Seattle.....Mercer.....Pacific Coast Agency
Spokane.....Lozier.....The Moylan-Reilly Auto Co.

COMMERCIAL VEHICLES

Alabama

Birmingham.....Koehler.....Drennen & Co.

Maine

Augusta.....Koehler.....Chas. Floyd Smith

New York

Westbury.....Koehler.....Michael J. Knipping

Pennsylvania

Philadelphia.....Garford
Trucks.....Garford-Phila. Co.
Sanitarium.....Koehler.....W. L. Fournery

Texas

Houston.....Koehler.....Young & Dwire

Accessories for the Automobilist

HELICAL Shock Absorber—The Helical Shock Absorber Co., Louisville, Ky., is marketing a device that operates on an entirely new principle and which is very simple and effective. It is shown in Fig. 1.

A steel helical screw passes through and meshes with an internally threaded bronze nut, which is pivotally mounted in a steel ball. This ball in turn forms a universal joint and is attached by an arm which is rigidly fixed under the lower spring clip.

The top of the helical screw is attached to a leather universal joint; and is also rigidly fixed to an arm set under the top spring clips.

These universal joints keep constant alignment and provide for pitching and side lashing of the car. Projecting from the bottom of the ball is a steel tube containing the lubricant; and the up and down movement of the screw automatically feeds the oil needed.

A fluted leather dust cover protects the screw between the two universal joints. This shock absorber offers little or no resistance to the normal up and down movement of the springs; and does not come into positive action until the spring is compressed to the farthest point in either direction, and tends to return suddenly. At the point of sudden reversal of the spring action, the helical screw must also reverse, but it reverses with sufficient attrition to break the shock or the rebound, and the spring again returns normally and without the usual resultant shock. It takes care of these shocks regardless of their rapidity of repetition.

An advantage of the principle used in

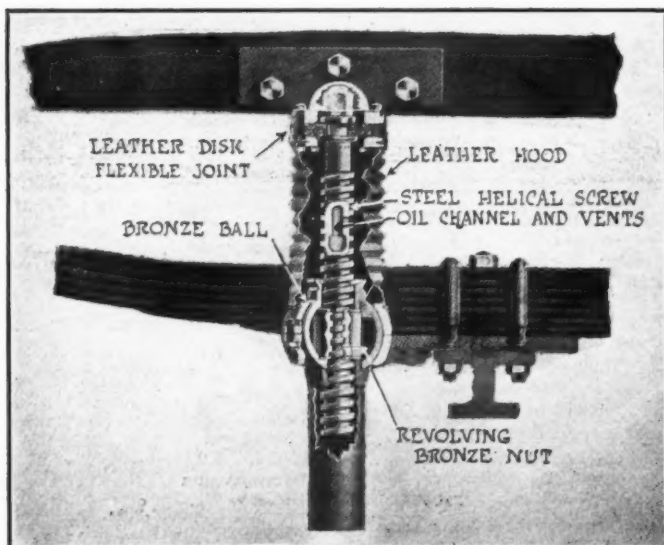


Fig. 1—New shock absorber in which a helical screw is employed

this shock absorber is its effectiveness under any load. No adjustments are necessary for the load and it is quick and automatic under all conditions. A set of four weighs only 34 pounds.

The device has had an experimental experience of 2 years, and has proven most satisfactory to all users, it is said.

The list price for a set of four Helical Shock Absorbers is \$75.00.

Ajax Electric Headlight Dimmer—A new type of headlight dimmer for electric headlamps has been introduced by the Wanner Mfg. Co., Chicago, called the Ajax and consists of a fluted aluminum cup as shown in Fig. 2, which fits around the base of the bulb. A small brass spring is used to prevent the cup from rattling. The Ajax, which has successfully passed the Chicago inspectors of headlight dimmers, spreads the light over a large area and still gives a good driving light. A pair sells for \$1.

Gittatit Pliers with Offset Jaws—Instead of making the jaws straight, the H. D. Smith & Co., Plantsville, Conn., has brought out a new design of slip joint pliers, Fig. 3, that are offset so that a pin or nut can be gripped when in a recess or depression.

In pulling cotter pins the heel of the offset often can be used as a lever to draw out the pin.

The tool is well-finished with polished jaws and is 7 inches long over all. The list price is \$5.50 per dozen.

Goodrich Rubber Bucket—A collapsible bucket, Fig. 4, that will stand alone has been brought out by the B. F. Goodrich Co., Akron, O. It holds 2.5 gallons and should be popular with motorists as it folds up into a small space, yet when water is needed for the radiator or when camping along the road it can easily be obtained. The price is \$1.50. A feature is the strainer spout. No valves or springs are used in the construction, the water pressure on the rubber being sufficient to hold the bucket in place.

A mco Frictionless Bronze—By means of a new process of combining a large percentage of lead with copper and tin, the American Metal Co., Pittsburgh, Pa., claims to have a bearing metal that is especially adapted

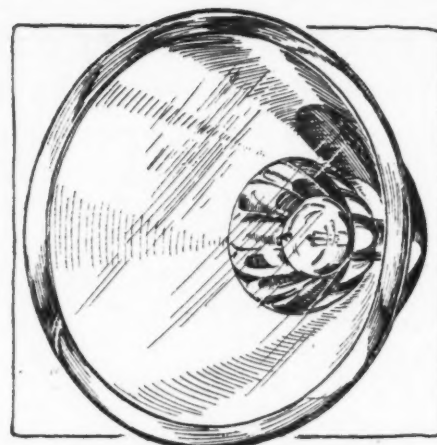


Fig. 2—Ajax headlight dimmer

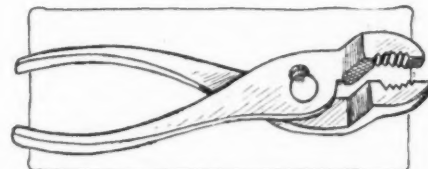


Fig. 3—Gittatit pliers with offset jaws

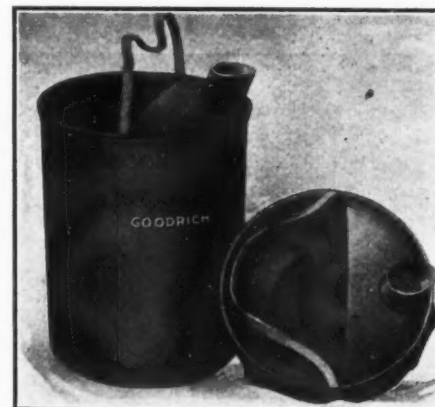


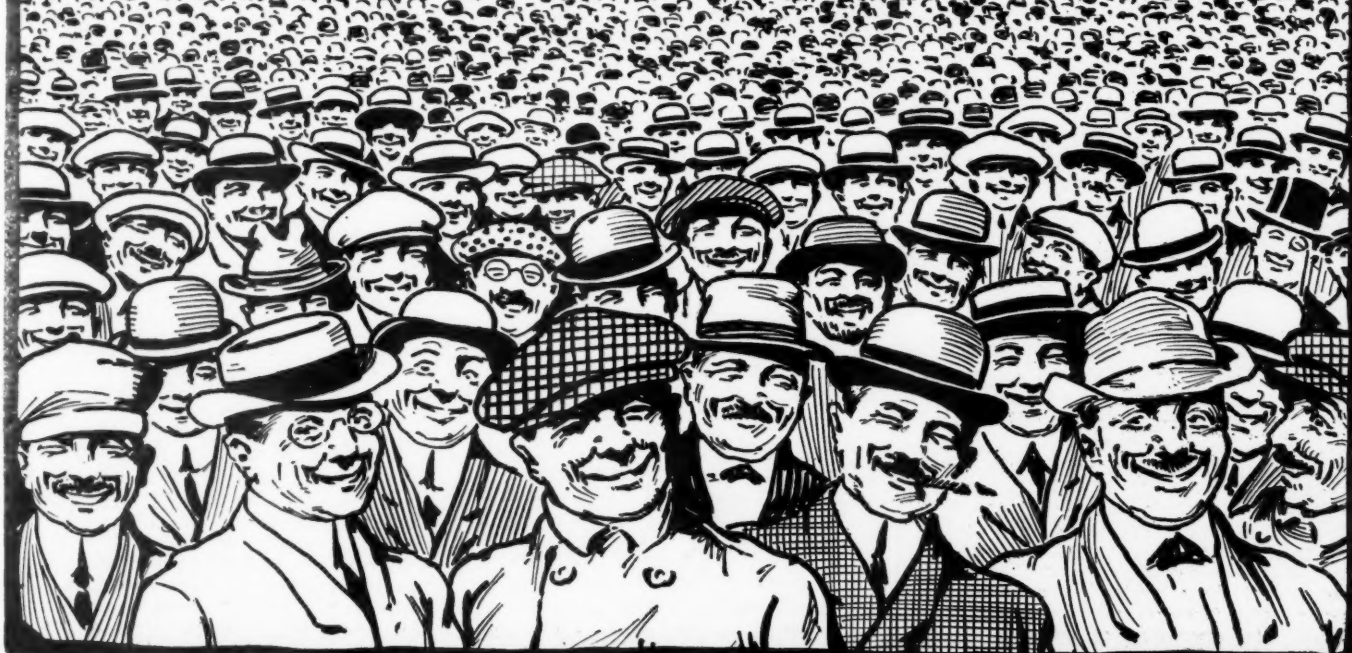
Fig. 4—Goodrich rubber bucket open and closed

for high speed machinery or where the pressures are heavy. It requires no babbitt surface and because of its toughness will wear infinitely longer than the best babbitt metal, it is stated. The composition consists of 30 per cent. lead, 65 per cent. copper and 5 per cent. tin. It is claimed that the large percentage of lead renders this metal as frictionless as any babbitt metal.

Joy-Ride Tire Compound—The Fiber Manufacturing Co., 1649 Court place, Denver, Col., is making a tire compound called Joy-Ride, which is a non-adherent, non-soluble compound, mixed with water, and a small percentage of denatured alcohol to prevent freezing. The selling plan adopted by this firm assures the unqualified satisfaction of the user. The liquid is sold only through its own representatives, at a permanent filling station; a written guarantee is given by the firm to every user that money is refunded if there is loss of air by a puncture to the size of a 20 penny spike.

Generating and Decarbonizing Outfit—Fig. 5 shows a complete generating and decarbonizing outfit, made by the Oxygen Generator Co., Inc., 304 River St., Troy, N. Y. Its operating cost per cylinder is but 14 cents. As the usual charge for cleaning is \$1 per cylinder the profit

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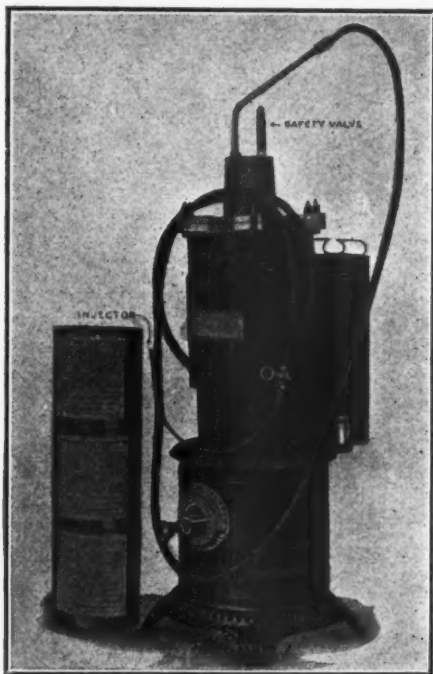


Fig. 5—Oxygen generating and decarbonizing outfit

is large. Therefore, while especially for the garage its low cost puts it within the reach of the individual owner. The complete outfit with enough chemicals to clean 18 cylinders costs but fifteen dollars. The recharge, called Oxygas, is sold in 4 ounce tin containers when bought in lots of six. Each can furnishes enough oxygen to clean 6 cylinders.

Shock Absorbing Cantilever Spring—

A new method of springing has been introduced by the Garden City Spring Works, Chicago, under the name of the Shock Absorbing Cantilever spring, Fig. 6, which consists of a cantilever spring and a double coil spring. The rear end of the cantilever is attached in the usual manner as is the fulcrum point, but the front rests upon double coil springs inserted in a bracket. The bracket thrusts downward and this is met with a counter thrust upward and in this way, it is said, frame rail twist is eliminated. The saving in weight due to this construction is another point in its favor and tests by the maker have shown it gives excellent results in checking rebound. When installed on a Ford car the system is slightly changed. In this a steel casting is made to fit the cross member of the frame. The casting has attached to it, at two of its projections, coils spring as shown. The other projections take the cantilever springs. It is said the weight of car bears upon the two coil springs, and the results claimed are easier riding with the elimination of recoil and greater safety in turning. The Ford installation sells for \$10.

J. & B. Fuel Saver—The J. & B. Fuel Saver, Fig. 7, is a device designed to automatically control a supplementary air supply with a view to effecting gasoline economy with which other benefits are entailed. It is tubular in shape and is threaded to an angle cock which fits into the intake manifold above the carbureter. At the other end is a hexagon screened nut through which the air is drawn. The operation of the two controlling valves visible through the glass

tube is as follows: With the motor running slowly the vacuum in the intake manifold is very high, or, in other words, the suction, because of the throttle being almost closed, is then more intense, and, this being so, the valve with the flat top is drawn to its seat, thus entirely cutting off the supplementary air supply. The closure of this valve is to a degree aided by the pointed valve, which is opposed to it. As the throttle is opened and the motor speed increases so the vacuum in the intake manifold becomes lower and thereby the spring tension which is always being exerted overcomes the suction in the manifold and opens the flat valve wider as the decreasing vacuum allows it to overcome the resistance of the pointed valve, thus allowing a variable supply of air to pass relative to the motor speed. The spring tension exerted in the flat valve is much greater than in the pointed one, and it is because of this and the varying suction in the intake manifold that they open and close in a graduated and practical manner—that is, to be full open at high speed and gradually coming to a positive closure as speed decreases or while coasting along or waiting in traffic. The travel of the flat valve can be restricted and consequently the air supply also by threading the valve with a screw driver in against the short pin which is visible in the center on the right, so making the device standard and adaptable to all motors. The device is nickel plated and sells for \$7.

Gemmer Portable Air Compressor—A handy air compressor for garages is the portable model A manufactured by the Gemmer-Detroit Starter Co., Detroit, Mich. It consists of a two-cylinder pump mounted on a 14 by 20-inch steel tank which in turn is placed on 4-inch rubber-tired, swiveled wheels. The

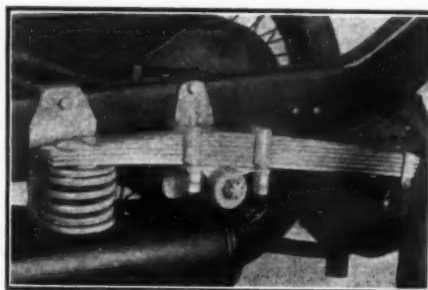


Fig. 6—Shock absorbing cantilever spring

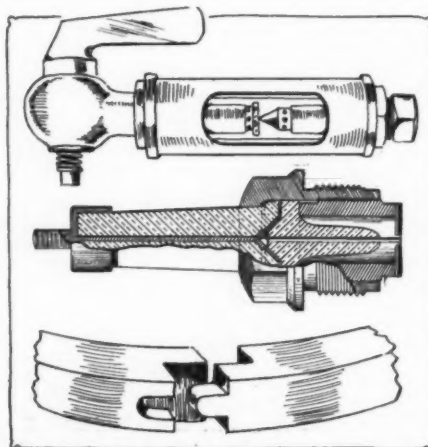


Fig. 7—Top—J. & B. fuel saver

Fig. 8—Middle—Sprung patent spark plug

Fig. 9—Lower—Leektite piston ring



Fig. 10—Everlastingly good terminals

pump is driven by a 1-3-horsepower electric motor which is equipped with the necessary cord and socket. A pressure gauge and 14 feet of hose complete the outfit. It takes 25 minutes to fill the tank with air at 175 pounds pressure.

Another type especially designed for sale to the private car owner and for emergency use in garages comprises a two-cylinder pump, connected to a 1-4-horsepower electric motor.

Sprung Patent Spark Plug—A spark plug, Fig. 8, is about to be put on the market which is notable for the reason that the lower half of insulating material and the central electrode are readily detachable from the rest of the plug, so that when the plug becomes fouled or the points burned out, a new unit may be substituted and the plug made as good as new. Another feature is that the plug can be provided with any number of sparking points to suit it for different types of engines. The inventor is A. Sprung, 126 W. 118th street, New York City.

Leektite Piston Ring—By the use of a special joint and a careful process of manufacture the End-Oxy Appliance Co., claims to have a superior piston ring, which is called the Leektite, Fig. 9. The joint is a combination type which is clearly shown in the illustration. The Leektite ring is made of a special grade of gray cast iron, which, after a rough machining, is laid aside for a period to allow thorough seasoning or equalization of the strains set up in the metal during the casting. The ring blanks are then put through a series of careful machining operations that produces a ring of exact size and shape.

It is stated that the special form of joint used presents a perfectly sealed opening when placed in a cylinder 3-64 inch oversize. The list price for motors of 3.5 to 5-inch bore is \$1.50.

Everlastingly Good Terminals—The Emil Grossman Mfg. Co., Brooklyn, N. Y., is offering an assortment of battery terminals, Fig. 10, in a box 10 inches square, that is intended to simplify and facilitate the sale of these articles. There are separate compartments for the various types of terminals and there is a place for everything. The result is a display that looks much neater than an assortment of odd sized boxes. The price is \$5.